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EVIDENCE AND ARGUMENTS

GIVEN BEFORE THE

Assembly Committee on Canals,

March, 19th, 1879,

March 20th, 1879,

March 25th, 1879,

Favoring the introduction, without expense to the State, of an improved system of towage upon the Canals, by a Railway to be constructed subsidiary thereto.

Committee:

Hon. J. H. Hurd	of Erie,
" I. I. Hayes.....	" New York,
" Titus Sheard..	" Herkimer,
" T. N. Van Valkenburg.....	" Niagara,
" Eli Perry	" Rensselaer,
" Edward Stewart	" Saratoga,
" C. A. Chickering	" Lewis,
" H. W. Davis	" Monroe,
" T. D. Penfield.....	" Oneida.

Clerk, - - - John P. Shumway.

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By the Buffalo, Syracuse and Albany Railroad Company. Copies can be obtained upon application to, or will be sent by mail, by addressing

F. E. FROTHINGHAM,

Secretary.

Coal and Iron Exchange Building,

21 Cortlandt Street, New York.



TESTIMONY GIVEN BEFORE THE ASSEMBLY CANAL COMMITTEE, IN REFERENCE TO AN ACT TO INTRODUCE, WITHOUT EXPENSE TO THE STATE, AN IMPROVED SYSTEM OF TOWAGE UPON THE CANALS BY A RAILWAY, TO BE CONSTRUCTED SUBSIDIARY THERETO.

Hearing before the Canal Committee of the Assembly in the matter of the construction of a railroad between Buffalo and Albany along the banks of the Erie and Oswego Canals, for the towage of canal boats, etc.

Present of the Committee, Messrs. Hurd, Sheard, Stewart, Davis and Penfield. The Chairman asked if there were any gentlemen who desired to be heard on the bill introduced by Mr. Davis, providing for the laying of tracks on the banks of the Erie Canal for the purpose of towing boats, and being answered in the affirmative, the Clerk was ordered to read the bill through.

1 AN ACT to introduce, without expense to the State, an
2 improved system of towage upon the canals by a
3 railway to be constructed subsidiary thereto.

1 *The People of the State of New York, represented in*
2 *Senate and Assembly, do hereby enact as follows:*

1 SECTION 1. The Buffalo, Syracuse, and Albany Rail-
2 road Company, being organized, incorporated and exist-
3 ing under and by virtue of the provisions of an act of
4 the Legislature of this State, entitled "An act to au-
5 thorize the formation of railroad corporations, and to
6 regulate the same;" passed April 2nd, 1850, and the
7 laws amendatory thereof and supplementary thereto,
8 and said Company having acquired thereby all the fran-
9 chises of a railroad in this State, through the countie
10 of Erie, Niagara, Orleans, Munroe, Wayne, Ontario,
11 Seneca, Cayuga, Onondaga, Madison, Oneida, Herki-

12 mer, Montgomery, Schenectady, Livingston, Wyoming,
13 Alleghany, Cattaraugus, Oswego, Lewis, Jefferson,
14 Chenango, Broome and Albany, between Buffalo and
15 the Hudson River, and Oswego and the Hudson River,
16 and having a projected line, as exhibited by the maps
17 filed in the said counties, coincident with the canals or
18 banks thereof, situate within said counties ; and said
19 company being willing and desirous to contract for the
20 towing of boats and floats upon the canals of this State
21 at a large reduction from the present cost thereof, and
22 to improve the banks of said canals, and to construct the
23 necessary structures, crossings, roadways and gradings,
24 without cost to the State, and to lay its tracks, and to
25 convey freight and passengers as well when said canals
26 shall be closed as at all other seasons of the year, upon
27 the terms stated in this act ; and said company being
28 willing to transfer to the State in perpetuity the said
29 structures, crossings and roadways, tracks, telegraphs
30 and fixtures immediately on the construction thereof,
31 under the approval of the proper officers of the State,
32 as hereinafter mentioned, reserving only the right to
33 the limited use thereof, as contemplated by this act.
34 Now in order to diminish the cost of the maintenance
35 and repair of the canals, and to increase their efficiency,
36 and to introduce improvements thereon, without ex-
37 pense to the State, the Land Commissioners and Superin-
38 tendent of Public Works are hereby authorized, em-
39 powered and directed, upon the request of said railroad
40 company, to contract for and on behalf of the State with
41 the said Buffalo, Syracuse and Albany Railroad Com-
42 pany, its successors or assigns, to exercise their corpo-

43 rate franchises upon the banks of the canals of the State
44 of New York, for the purpose of carrying out the pro-
45 visions of this act, subject, nevertheless, to the control
46 and management of the said canals, as now vested in
47 the State, under the Constitution of the State of New
48 York, and to construct such structures and crossings,
49 and to make such gradings and roadways as may be
50 necessary for the purpose of introducing upon the
51 canals of this State a system of towage by locomotives
52 upon the banks, and of securing cheap transportation,
53 without expense to the State, in such manner and upon
54 such terms, subject to the control and management as
55 aforesaid, in addition to those hereinafter stated, as shall
56 be approved by the Superintendent of Public Works.

57 Said system and structures shall not interfere with
58 navigation in the said canals, nor with the management
59 thereof by the proper officers of the State, nor with the
60 free and unrestricted use of the said canals, as now pro-
61 vided by law.

62 All the structures, roadways, telegraphs and other
63 fixtures placed upon the banks of the canals shall at
64 once be and become the property of and be vested in the
65 State of New York, and in addition thereto the said
66 railroad company shall convey to the Commissioners of
67 the Canal Fund, without cost to the State, one million
68 dollars of their capital stock, at par, as a special sink-
69 ing fund, to be accumulated and disposed of as herein-
70 after provided for.

1 SECTION II. The said railroad company, its successors
2 or assigns, shall agree to tow for hire, by their locomo-
3 tives or by animal power, each boat or float that may be
4 offered, loaded or unloaded, at ten cents per boat per
5 mile for any (greater or less) distance ; and they shall
6 agree at all seasons of the year, whether the canals shall
7 be closed or not, to transport freight and passengers on
8 the roadways along said canals, under the approval of
9 the Superintendent of Public Works, and to run trains
10 for such purposes, at a charge for freight not exceeding
11 three-quarters of a cent per ton per mile for through
12 freight, and not exceeding one and one-half cents per
13 ton per mile, and twenty cents for loading or unloading
14 local freights, in all cases in quantities not less than a
15 car load, and in less amounts such uniform rates as the
16 railroad company may establish ; and at a charge for
17 passengers, through or local, at rates not exceeding one
18 and one-half cents per mile ; and through freights
19 under this section are hereby defined to mean freight in
20 quantities not less than a car load, starting from any
21 point on said road, to be carried to its eastern or west-
22 ern terminus, or starting from either terminus, to be de-
23 livered at any one point on said road.

1 SECTION III. The said railroad company shall agree to
2 apply ~~its~~ earnings derived from said traffic as follows :

3 *First.*—To pay to the Commissioners of the Canal
4 Fund as and for a dividend on the one million dollars
5 worth of stock, to be transferred to said Commissioners
6 as specified in Section 1 of this act, five per cent. semi-

7 annually on the par value of said stock ; said dividends
8 to commence from and after the time the work contem-
9 plated in this act shall be completed between Buffalo
10 and Albany.

11 *Second.*—To keep all the structures, roadways tele-
12 graphs and other fixtures to be constructed as aforesaid,
13 in good order and repair.

14 *Third.*—To the payment of all the operating expenses
15 of the company under the contract mentioned in this act.

16 *Fourth.*—To the payment of all interest which may be
17 due upon the bonds of the said road and the dividends
18 on the stock not exceeding five per cent. semi-annually,
19 and all surplus income shall be paid annually to the
20 Commissioners of the Canal Fund, who are hereby au-
21 thorized, empowered and directed annually to appro-
22 priate the same as follows, that is to say: One-half
23 thereof, in whole or in part, towards the reduction of the
24 principal of the canal debt of the State, or, in the dis-
25 cretion of said Commissioners, in whole or in part, to-
26 wards the reduction of the tolls on the said canals ; and
27 the other half of said surplus income shall be annually
28 appropriated towards the sinking fund hereby author-
29 ized and directed to be created by said Commissioners
30 from the said one million dollars worth of stock and its
31 accumulation, as in this act provided for. The disposi-
32 tion of said surplus income, as in this act specified, shall
33 so continue until all the bonds and stock of the said
34 railroad company shall be vested in the Commissioners
35 of the Canal Fund as and for the property of the State ;

36 and when all the bonds and stock of said railroad com-
37 pany shall have been purchased as aforesaid, the whole
38 of said surplus income shall be appropriated for the or-
39 dinary expenses of management and repair of the said
40 canals, unless the Legislature shall otherwise direct.

41 The said Commissioners shall receive all interest which
42 shall accrue on the bonds and all dividends which shall
43 be declared on the stock in their hands, and shall use
44 such interest and dividends to purchase other bonds and
45 stock of the said company at a price not exceeding one
46 hundred and thirty dollars on each one hundred dollars
47 of the bonds of said railroad company at their par
48 value, and one hundred and fifty dollars on each one
49 hundred dollars of said stock at its par value; and no
50 stock or bonds shall be issued by the said company after
51 making said contract, except the said stock or bonds be
52 subject to the foregoing conditions, and the persons to
53 whom the same shall be issued, as well as the present
54 owners of such stock and bonds, shall in writing express
55 their assent thereto and agree to sell the same to the
56 said Commissioners on demand at the above mentioned
57 prices. And in and by said contract the said railroad
58 company shall expressly agree to each and all the fore-
59 going provisions.

1 SECTION IV.—Whenever the said Commissioners shall
2 have in their hands a sufficient and proper amount of
3 the sinking fund herein provided for, for investment,
4 they shall give public notice by advertisement to be in-
5 serted daily for at least fifteen days in at least two daily
6 newspapers published in the City of New York of their

7 intention to invest, specifying the amount, and inviting
8 proposals for stock or bonds of the said railroad com-
9 pany, the lowest of which proposals shall be accepted,
10 provided the same shall be below the sums hereinbefore
11 specified.

12 In case adequate proposals shall not be received, the
13 said Commissioners shall demand and purchase stock or
14 bonds, as herein otherwise provided for.

1 SECTION V.—The contract by this act authorized shall
2 in terms continue until the entire interest and ownership
3 of the said railroad company shall be and become vested
4 in the State as hereinbefore provided for, and shall in-
5 clude the reciprocal terms and provisions in this act spe-
6 cified, and such other reasonable agreements and condi-
7 tions for the better carrying out of the intents and pur-
8 poses of this act, as the Superintendent of Public Works
9 and Land Commissioners on behalf of the State and said
10 company may agree to, together with a provision that
11 the system of towage hereby authorized shall be subject
12 to the rules and regulations prescribed by the Superin-
13 tendent of Public Works for the navigation and use of
14 the canals ; and also a provision that in case the said
15 railroad company, its successors or assigns, shall neglect
16 or fail to introduce said system of towage on the Erie
17 and Oswego canals, between the Hudson river and the
18 cities of Buffalo and Oswego, within three years, unless
19 prevented by legal proceedings, after the contract au-
20 thorized by this act shall have been made, then said
21 contract, at the option of the Superintendent of Public

22 Works and Land Commissioners on behalf of the State,
23 shall cease and determine.

1 SECTION VI.—The Superintendent of Public Works
2 is hereby charged with the execution of this act con-
3 cerning the navigation and improvement of the canals
4 as herein contemplated, and the other State officers re-
5 ferred to herein are required to do every act and thing
6 necessary to carry into effect the provisions of this act
7 wherever the same refers to them.

1 SECTION VII.—This act shall take effect immediately.

Mr. Crane said he appeared on behalf of the Buffalo, Syracuse and Albany Railroad, but should be glad before proceeding to make any remarks to know if there were any who wished to be heard in opposition or in favor of the bill, and also the length of time that the committee would set apart for hearing. He said he would prefer to state his part of the case continuously, and if not finished to-day, to go on to-morrow. It would take them till then to accomplish their part of the case.

The Chairman stated that, so far as he knew, they would be able to go on to-morrow, if necessary, and that the hearing would be set down to-morrow for the afternoon, the same as to-day. This evening the committee would hold session till tea-time.

Mr. Crane then proceeded with his argument, as follows :

This bill, gentlemen, that you have before you, is one, probably, of greater importance in its effect upon the present lines of communication, than any other bill offered or introduced into the Assembly since the enlargement of the Erie Canal; and if it operates as we expect, it will produce a greater revolution in transportation than that enlargement produced. It is a matter of great import. It affects capital now invested to an extent, probably, that very few, if any, of you are aware of. It affects

the interests of the people of your own State, and of the whole Northwest, both now and hereafter, probably, more than any other question that has been considered within the last thirty years in your Assembly. Therefore, I beseech for it a careful and candid consideration. We have no axe to grind. The bill is either what it purports to be on its face, and what we believe it to be in reality—one of great public moment, one of great public interest—or it is nothing.

I desire, in opening this case, to request that, if there are any statements made here which are not proved or are loose, the members of this committee will call the parties' attention to it, and not allow one step to be taken until the facts are verified by incontrovertible evidence. In order that you may understand the interests which are to be affected by this bill, I wish you to go with me first to Baltimore—a Southern city that owns and controls a line of railroad that is affecting to-day New York city and the other seaboard cities more than any other interests between the East and the West. The merchants of Baltimore since 1832 up to 1877 have had but one policy—that is *Baltimore*. What has been the result? Baltimore controls its line of railway, and dictates its policy as a city over a distance of about 840 miles, to a point of competition lying west of you, to Chicago; and while you have been laying your four tracks in New York and taking care of your canals, that city, as a city, has been extending its lines of railroad, and when a few years ago it opened its line to Chicago, what took place?

Commodore Vanderbilt, the great railroad king, invited Mr. Garrett, from Baltimore, together with Mr. Scott of the Philadelphia line, and Mr. Jewett of the Erie, to meet him in New York. The public prints in New York are my authority for the statement that Vanderbilt invited those gentlemen to confer with him in New York upon this question of railroad transportation. Garrett replied in a short note published in the *New York Times*:

“The distance is no greater from New York to Baltimore than from Baltimore to New York. I shall be pleased to see the gentlemen in Baltimore.

“Respectfully yours,
“GARRETT.”

Then and there, for the first time, was this power made manifest to probably one of the greatest powers in railroading on this continent, Vanderbilt the elder. Did he go to Baltimore? Yes, sir. What sent him there? Because a power existed there which he had failed to appreciate. One or two days after, the same paper says, a drawing-room car left Jersey City, with Mr. Jewett, the Commodore, and Mr. Scott on board, going by express to Baltimore. The Commodore said, "We are now fighting and contending for business, and what is the use of cutting and thrusting at each other, when we have nothing to do but to agree among ourselves in regard to rates and come to some arrangement, reduce it to writing, and act by it." This was done, and the great Scott and Jewett and the Commodore agreed to it, but Mr. Garrett says, "All right; hold on a minute; your lines are longer to the seaboard from Chicago than ours is to Baltimore, and for that reason I want five cents a hundred pounds on all freight coming to the seaboard less to Baltimore than to New York." The Commodore said, "We can't go that." The reply was, "Then we may as well stop all negotiation." How was it settled? It left the little bit of corporation of "Baltimore and Ohio," controlled by Baltimore, masters of the situation, and they have been masters of it until the present. Your railroad companies, ever since the Commodore's death, have made this allowance of five cents a hundred to the Baltimore and Ohio Railroad, and the same combination made the arrangement by which Philadelphia was to have her freight at three cents a hundred less than New York city.

(This agreement, the Speaker stated, Wm. H. Vanderbilt entered into to prevent a railroad war of extermination, as the New York Central could not be expected to fight the battle in that way.)

Baltimore has a line of railroad, costing substantially \$86,000,000, from Baltimore to Chicago. On \$36,000,000 of this they pay no interest. That is the cheapest kind of money to build railroads with; you can get nothing cheaper than that. They pay no interest on their \$36,000,000, because the money came from the earnings of the road over and above the dividends paid on the stock since 1861. You must keep this in mind in order to understand whether New York can be made the cheapest point instead of the third in rank from the West to the sea-

board. The remaining part of the capital of the Baltimore railroad, \$50,000,000, is about the amount on which they have to pay interest. Then the Cumberland Mountains, having 120 feet up-grade, going West—a crooked road—has this compensation that, coal on board their locomotives costs them about 90 cents a ton; and coal, water and locomotives will overcome mountains.

The Pennsylvania line, which holds the next point against your city, has, by combination, cheaper rates of freight to-day than New York, both on that coming East and that going West. Philadelphia, like Baltimore, was the originator of its own road, furnishing a large portion of the money to build it, and largely influences its policy. If you will look at the grain shipments from Philadelphia, and the business coming from the West to the seaboard for the last three years, you will see the effect of this combination as regard your own State. That line of railroad, crossing the Alleghany Mountain with its 90 feet grades, has not only run to Philadelphia, but it has absorbed the lines of railroad across the State of New Jersey, and has made New York city connections, and reaches their steamers at Philadelphia by three cents a hundred less than New York. The cost of their line of railroad is about 180 odd million dollars, running to the same point the Baltimore and Ohio road reaches at a cost of only \$86,000,000. If you follow the same combination to Buffalo, at the foot of Lake Erie, you will find what I found three years ago. Merchants care precious little whether the in-freight goes to New York or not, as long as they get it shipped on board the steamer three cents a hundred cheaper.

New York, your metropolis, neither owns nor controls a line of railroad, yet your great trunk line, the New York Central, with comparatively no grade to overcome, has possession of the only natural highway from the seaboard to the West. You have \$90,000,000, as appears by the last annual report of the New York Central, of capital stock, and you have in addition a bonded debt of \$40,000,000, and you have the Harlem railroad, with its capital of about 23 millions, leased in perpetuity at 8 per cent.

On the other hand, your great line of the Erie has passed through divers ramifications till it stands now with one consolidated mortgage of 60 millions, and a capital stock of about 60

millions more, a majority of which is held in London, where its policy is dictated. If you go west of Buffalo and make the line complete, where you reach the point of competition with Philadelphia and Baltimore, you have the Lake Shore railroad, on which there is a consolidated mortgage of \$50,000,000, and a capital stock, on which occasionally a dividend is paid of \$50,000,000 more, making an aggregate of capital by the Shore Line of about \$220,000,000, as against Baltimore's \$86,000,000. The Erie railroad, with its connections on the south side of the lake, is now combining with the Atlantic and Great Western. It is very important for you to understand what interests control these two great railroads. Wm. H. Vanderbilt controls the first, the second is controlled by the syndicate which sits in London, where the majority of all the stock of the Erie railroad has been transferred. For that stock they have issued certificates, but those certificates have no right to vote. It is London which makes and remakes the management through your own State of the line, which the State contributed three millions to build. In addition to the ownership on the south side of the lake, Vanderbilt owns the Canada Southern Railroad, extending to Detroit, probably the best graded line in the country. I have examined it. It lies in long straight lines with easy grades. Locomotives are capable of taking forty freight cars on it from the Detroit river to the city of Buffalo. That line was built to form a continuous line with one to be built across Michigan to Chicago, which failed in 1873 during the panic. It was never carried out. The road failed, and is now owned by the one man who owns your New York Central. That interest, in order to protect itself on both sides of the lake, owns and controls a majority of the road from Detroit to Chicago. Take the capital of the Michigan Central, as printed in the reports (a majority held by Vanderbilt), with that of the Canada Southern, and add to them the extension to Detroit, and you have a capital for the line running through Canada, connecting your New York Central with Chicago, of about \$200,000,000, on which interest has to be paid, as against Baltimore's \$50,000,000.

Next there is the Grand Trunk Railroad, of Canada, extending from Chicago to Quebec, which built the international bridge at Buffalo, thus giving it a connection with the lines of railroads

through your State. That line and the Great Western of Canada are owned and controlled in London. That and the Grand Trunk have been made comparatively worthless, growing out of competition, but although longer lines to the seaboard than either of the others, they, like Baltimore, dictate terms to all the others. These are the powers you have as dividend-paying roads to deal with to-day. The Erie railroad and the New York Central railroad, through the London interests, harmonize every time. And they harmonize for what? Because it is for their interest to do so. They do not consult the business interests of New York. Capital consults its own interest every time, and it is just as natural for it to do so as it is for water to run down hill. I do not blame them for doing so. I am not raising these questions with a spirit of fault-finding, but in order that you may understand exactly what the power is you have to deal with. I mean to say that the Erie railroad, through the London syndicate and the one-man power at New York, are a unit in action every time when occasion calls for it. Next to that, your New York combination is in harmony every time with what Philadelphia wants, because the Pennsylvania Central has an interest account rolling up on four thousand miles of leased railroads that has made for Philadelphia such a power, both in Congress and out of Congress, that it was fitly illustrated less than two years ago by a member in the Pennsylvania Legislature rising in his seat and saying, "I move that a committee be appointed to wait upon Tom Scott and ask if he has any further business, to say so, and if not, we will adjourn."

That line of railroad to-day, with its 4,000 miles of leased lines, is like a great tree taking root on the banks of the Delaware and extending its branches to Texas. It is a tremendous power, which will break down almost any man who undertakes to give it his constant, daily care. It broke down Mr. Scott, and sent him to England to recruit.

In 1869 I had occasion to investigate your canal, and I want to say here that I have watched the Erie canal with an interest second to that which I have taken in no public work on this continent. I have looked upon it as a 'great bulwark against the land sharks growing up among you. In 1868 I was invited by a majority of the Senate of Massachusetts, as a railroad man of large experience, to address the Legislature on the question

of transportation. We had three separate meetings. I made these remarks, which were then at variance with all preconceived notions of canal and railroad men, with the exception of a former superintendent of a Pennsylvania railroad line. I said : "Gentlemen, a line of railroad such as Boston has from Albany, passing the summit of the Green Mountains, 1,475 feet above the tide, between the Hudson and the Connecticut, and a summit of 840 feet between the Connecticut and tide-water to Boston, passing these two summits with a double track from Albany, at eight miles an hour going East and twelve miles an hour going West, can move the whole tonnage of the Erie canal as cheaply as that canal can move it per ton per mile from Buffalo to Albany." This statement was called in question then by railroad men, by the president of the road, Mr. Chapin, and by your own Mr. William J. McAlpine, former State Engineer of the State of New York.

I then said, "This transportation question is one affecting \$700,000,000 of your annual manufacturing interests in the State of Massachusetts, and your true interest lies to ally yourselves with the canal at Albany, both offensive and defensive, to reduce the rates. As the result of the statement, I recommended that inasmuch as it was not expected that the Legislature, meeting two or three months in the year, should settle these great questions; that they should appoint five discreet men and leave it with them to settle what legislation was necessary to secure to the people cheap transportation, and that nothing should be done until their report was made. The recommendation was passed by a unanimous vote. The commission of five was appointed; they were to receive no pay for their services. That commission made its report in 1870, and a copy of it was sent to your State Engineer. What was the cost of canal transportation—the actual cost? We got at it in this way. It is susceptible of but one answer. Taking the cost of your canal transportation for ten consecutive years, commencing with 1857, from the annual reports as shown by your Comptroller's books—first, there were the expenses to lock-tenders for taking care of the locks, and for ordinary and extraordinary repairs. This, for ten years, amounted to \$480,000 a year. I asked Mr. McAlpine if the State of New York could, from 1868 to 1878, maintain and keep the canal in repair for the same average cost as for the previous ten years,

and he said "Yes." \$480,000 a year, then, it is shown, can maintain and keep the canals in repair. Suppose the State of New York takes off all the tolls, can the railroads compete with the canal then; will the diminishing of the tolls make it more profitable to the boatmen? The cost of moving the freight from Albany to Boston, cars going loaded one way and empty the other, moving the same number of tons that was moved on the Erie Canal, eight miles an hour going East and twelve miles going West, would be $3\frac{1}{2}$ mills per ton a mile. Your canals cost, irrespective of repairs, about 5 mills a ton a mile, going loaded one way and empty the other. Therefore, the Central railroad from Albany to Buffalo can move the whole tonnage of the Erie Canal without profit or loss, at over 30 per cent. less than you can through the Erie Canal in its present management. The cost of repair per year, if my memory serves me aright, averages about \$480,000; it averaged that from 1857 to 1868. What will it now cost, with the water in the canal and all the expenditures made, to move 500,000 tons of freight from Buffalo to Albany, exclusive of loading and unloading? First, there is the interest on cost of the boat, and the annual cost of keeping it in repair. How long, with the annual repairs carefully made, will that boat last? We say it will last 10 or 11 years. One-tenth of the life of the boat must be charged, then, to each year's business. Another item is the labor on the boat, that is to say, the labor of the captain, the men, the horses, etc.

If you wish to ascertain how much freight costs you where you have full loads always in one direction only, that is the way and the only way to make up the account. I found there were a certain number of boats making trips for the last ten years; the boats make so many trips; the actual cost of each is so much money, and so many boats move 500,000 tons of freight, and that 500,000 tons of freight must be charged with all the expenses of the canal. The next question is, what will it now cost to move a second 500,000 tons of freight from Buffalo to Albany the same season, shoeing the horses, putting the boat in good condition, etc. It will cost you the same as the first instance, less the amount paid the State for Canal expenses. What will the third 500,000 tons cost you? It will cost you just the same as the last—all of which holds true until the limit is reached at which the State incurs additional expenses on account of increased business. There is no more mistake about

this than there is about the statement that two and two make four. It is the actual statement of the facts as appears from your own books.

I here take up the cost of railroad freight. You will say that no two railroad men would agree with you in that. I admit it; but every railroad man will agree upon this—that, independent of the tolls, if the State were to lay out, to keep the canal in repair \$480,000 a year, the cost of moving freight from Buffalo to Albany is within a fraction of 5 mills per ton per mile, if you go back empty; and just in proportion as you get a return freight, so you will diminish the cost. Just so it is with the railroad. What are the charges of the railroad? What does it cost in that way? The cost of the New York Central from Buffalo to Albany, for freight, as compared with the canal, is first three hundred miles of rotten ties once in seven years on the four tracks; one-seventh of this is to be put upon each year's business; it has also to build a new fence from here to Buffalo every ten years; it has the renewal of all the crossings from Buffalo to Albany once in about five years; in addition to that there is the cost of removing the snow from the tracks, which varies, as some years you have it and some years you have it not; then there are rotten platforms and rotten depots to be rebuilt. These amounts can now be made a matter of mathematical certainty after an experience of thirty years, and the railroad man who doubts that fact must be ignorant of his business. These are costs that are to be incurred before you put a railroad car into the account. Then come your cars and locomotives; then the labor and everything connected with it; but the greatest question of all is the question of speed.

If you run your trains laden with freight at a high rate of speed, why then you must foot the bills. About twenty years ago the Reading Railroad sold for \$8 to \$9 a share; their notes went to protest; and the brokers who put the stock on the market, although wealthy men, were almost mobbed by the people because they put what was then thought to be worthless stock upon the market to take the place of money. Where was the trouble? Why, the Reading road were running their coal trains at a rate of speed ranging from twenty to twenty-five miles an hour. That was what was ruining the road. The engineer, who was in favor of the canal in preference to the railroad,

made it perfectly plain to our people that the railroad was worthless. When I came to investigate the question of doing business with high speed, I found the wear and tear in consequence would eat up all the earnings. Since that time, having reduced the speed to eight miles per hour, they have been enabled to pay 5 per cent. dividends semi-annually on the par value of this same stock. Take your own line from here to Buffalo—your canal working at the rate of $1\frac{1}{2}$ miles an hour, for instance—a railroad man comes along and says, “I will move it at the rate of 20 miles an hour.” “Yes,” we say, “but what will it cost you? If you move it 20 miles an hour you must pay the bills.”

In 1873 I was going to Buffalo on an express train from Syracuse. I was sitting in the drawing-room car with a gentleman, and we passed freight trains coming at the rate of thirty miles an hour—four trains consecutively, coming one right after the other. I remarked to my friend, “There is not one ton of freight on those trains which we have just passed for which the railroad will get a new dollar for an old one, because the rates of speed will devour all the earnings; and if the Central railroad does its business in that way, it will fail.” The next morning, in Buffalo, on taking up the paper, my eye glanced upon an accident upon the New York Central.

One freight train passing a bridge broke its axle; before it had time to right itself, another train came up and gave it a boost, sending it into the river; a third train came upon the second and treated it likewise. This was simply because they put 350 tons of cars and 350 tons of freight with fifty tons of a locomotive at a speed which they could not control.

Is there any way in which the State of New York can lessen canal transportation so that it will be cheaper than railroad transportation during times of navigation. First, it was attempted to put steam upon each boat, but that has been abandoned; the next question was, can steam tugs be used in towing your boats? This was shown to be dearer than horses. The next question was, if you owned the canal, what would you do with it? That is the present question. I answer it by saying, I would grade the canal banks, grade at the locks, and then lay a railroad track upon each side of the canal from Buffalo to Albany, from thence continuing along the west bank of the Hudson river to New York.

When done, I would take a locomotive, in charge of one man, and connect it with five boats carrying 1,200 tons of freight, and take the fleet from Buffalo to Albany. What would it cost? I found if I had no interest to pay upon my tracks, if I was allowed to furnish my own locomotives, the labor and wear and tear, etc., would cost about thirty cents a mile for five boats, carrying about 1,200 tons of freight, and no railroad could ever be constructed to do it so cheaply. If you lay your rails to draw boats, and put on the locomotives to do that work, then why not lay other tracks? What would it cost to fix the road and make the railroad ultimately a free road to the people—to be owned by the State of New York? I came to the conclusion that if you should duplicate your cars with lightness and strength combined, there is no railroad in this country, running through such a section as from Buffalo to New York, which could carry freight at so small cost, and with so easy grades as that would show. And I said the people own it now, and why should they not forever? It will interfere with nobody; it will pull nobody down. It is like a man about to build a factory, who meets another having a loom capable of making cotton a cent a yard cheaper than by the old form; would not the manufacturer at once adopt the loom as the best one? would he not be stupid to refuse it? Then why not act on the same principle with regard to the canal? Your Constitution prevents the State from borrowing money and doing for the people what ought to be done by the people themselves. Our organization proposes to do that—lay the tracks, put up the machine shops, put on the locomotives—after which it proposes to make the entire road the property of the State. The railroad company, from its earnings, are to keep it in repair. They are to create a sinking fund from which they will in ten years make it refund every dollar it has cost the corporation, with premiums, etc. At this point I wish to call the attention of the committee to a witness. I wish to show the feasibility of this plan by your Canal Commissioners, and then place it in such a way that the public are protected in every particular. I wish to put this bill in such a form as shall accomplish these ends safely. I will be glad now, without going further, to ask Mr. Barclay a few questions.

Mr. Crane asked Mr. Barclay the following questions:

Q. Have you had any experience in canal transportation in past years?

A. Yes, sir; I think so.

Q. What has your experience been?

A. I have had an experience in towing boats by steam on the short line in the harbor of Whitehall. I procured an engine.

Q. I think you don't understand my question. How long have you been connected with the Erie Canal?

A. A number of years; a Commissioner of the State for three years.

Q. Have you had any experience with towing by steam tugs on the canal?

A. Yes, sir,

Q. State what it has been, what you found it?

A. It is entirely impracticable, for the reason that the steam tug will only tow two or three boats, and the wheel has a tendency to tear up the bottom of the canal. If you have three boats and a tug you have a loss in regard to lockage—the lockage of one boat on the whole trip and the carrying capacity of one boat—which would deduct about one-fourth from the freight.

Q. What is your experience and knowledge with regard to the use of steam upon the boat itself?

A. It is liable to the similar objection; one-fifth of the carrying capacity of the boat will be required to carry the machinery and fuel, and you would, with one-fifth deduction for that, have to make five trips to get as much freight as with four trips if you had the whole carrying capacity for freight.

Q. Have you had any experience about the Stevens system?

A. I do not know about it, but it would be open to the same objection as the other. The boat would have to carry more or less machinery and fuel.

Q. What is your opinion as to the best method of applying steam on the canal?

A. My opinion is, that putting steam on the tow-path is the most practicable and cheapest way of towing by steam, for that secures you your whole carrying capacity on the canal, and your whole propelling power on the tow-path.

Q. Did you ever make any experiments in relation to that while you were Canal Commissioner?

A. Yes, sir; in Whitehall Harbor, on a slip 1,000 feet long, we had a locomotive engine hitched to two boats loads of ore,

and a steam tug at the other end. We ran one-eighth of a mile at the rate of four miles an hour.

By the CHAIRMAN.—You did not meet with any boats in trying the experiment?

A. No, sir.

Q. Did you go through any locks?

A. No, sir; I could not get any place but this, with a railroad track?

Q. What depth of water was there?

A. Eight or nine feet.

Q. Isn't that rather deeper than the canal?

A. Yes, sir; we tried another experiment between Troy and Albany?

Q. When was this?

A. In the fall of 1872; we towed two boat loads of lumber from West Troy to Albany with a steam wagon brought from New Jersey, in $1\frac{3}{4}$ hours, a distance of six miles; the line broke.

By Mr. CRANE.—What was the power of the steam wagon?

A. I do not know; it would snatch a boat up and tow at the rate of three or four miles an hour; it was a large engine with three wheels a foot wide.

By the CHAIRMAN.—Did you draw the boat from Troy to Albany?

A. Two heavily laden boats in $1\frac{3}{4}$ hours for a distance of six miles.

Q. How heavy was the boat load?

A. I suppose 240 tons; the engine was powerful, and the lines would not hold; we didn't provide her with a sufficient line; we could, had we done so, have come down at the rate of four miles an hour.

By Mr. SHEARD.—You would get up a good deal of momentum or headway at that rate, would you not?

A. No, sir; not very much; not near as much as the light boat would.

Q. Could you tow, on an average, four miles an hour that way?

A. Yes, sir.

Q. How much water did the boats draw?

A. Six feet.

Q. How much leeway was there between the bottom of the boat and the bottom of the canal ?

A. About a foot ; it would give that average on the Erie Canal.

Q. With that leeway you could run four miles an hour and not strike the bottom ?

A. From $3\frac{1}{2}$ to 4 miles an hour we could.

Q. The depth in the places where the experiment was tried was about 8 feet ?

A. Yes, sir ; in Whitehall Harbor it was.

Q. It is less than that on the Erie Canal ?

A. Yes, sir ; I recommended the Legislature to make a small appropriation to lay the track down between Albany and West Troy to experiment on, and as there was a great many applications for new improvements.

By the CHAIRMAN.—Do you think there would be any difficulty experienced in getting boats through the locks ; they would be obliged to wait some time, would they not, for you can only lock through one boat at a time ?

A. Yes, sir ; you would be obliged to wait a little.

Q. How much for a boat ?

A. Four to five minutes.

Q. Doesn't it take fifteen minutes sometimes ?

A. Not if properly managed.

Q. Doesn't it take that now ?

A. I don't know ; I have locked boats in three minutes, frequently ; you have double locks, and put a short line on the forward line and a long line on the other side, and then you can manage it.

Q. Suppose you were to lock down ?

A. The same rule applies.

Q. Would you pull a boat with a line attached to the boat going out ; can you draw a boat coming in by a boat going out ?

A. There would be no trouble at all in that.

Q. Would it not be apt to break the line ?

A. Your towing line should be of steel wire.

Q. Would that be flexible enough ?

A. Yes, sir ; just as well as a hemp rope.

By Mr. CRANE.—Is your report in print?

A. Yes, sir.

Q. What year was it?

A. In 1872.

The extract from the report was here read by the Clerk as follows:

"I believe the time has come when some method should be devised for towing boats by steam. The large increase of tonnage on our canals, together with the late horse epidemic, admonishes us that propelling boats by horse power can no longer be depended upon. There is no doubt steam can be applied to the towing of boats in many ways, but which of these is the best is a problem yet to be solved. The plan known as the Belgium system is thought to be practicable, but of it I have no knowledge. The method of having the propelling power in the same boat that carries freight is, in my opinion, open to serious objections; at least 20 per cent. of the capacity for carrying freight is lost, which would be equal to a loss of one round trip during the season of navigation. Besides, the wheel of the propeller is liable to tear out slope-walls, which would fall in the bottom of the canal, making it dangerous for loaded boats to pass over, and the wheels would create swells, which would be very injurious to the banks of the canal. The plan of towing a fleet of boats by a steam tug is also objectionable. The propeller of all these tugs or boats would more or less injure the bottom of the slope-walls, and create swells which would be injurious to the banks; besides, a boat with her machinery and fuel on board will require 20 per cent. of her propelling power for her own propulsion, and the slip of the wheel (which is a considerable loss of power) leaves less than eighty per cent. to be used in propelling freight. Again, a tug could tow but four boats, and at a rate not exceeding from two to two and one-half miles per hour. Another objection to applying steam in this manner is, that the tugs have to be locked through the same as boats loaded with freight, and for every four loads of freight, there would be an extra lockage (or one-fifth more lockages than now), which, from Buffalo to Albany, would at least consume one day, lessening the business season one round trip, which should be obviated, if possible. Then there would be one-fifth more wear and tear to the locks, which would make a large additional expense in repairs. An experiment made during the past season

at Whitehall (a report of which is hereto annexed by Mr. J. A. Allen, civil engineer, who was present and assisted) has strengthened my opinion that the propelling power should be put upon the towing path. A light rail laid on long timber lengthwise, bedded in the tow-path and tied together so it could not spread, would be sufficient to carry a powerful engine with low wheels. Such an engine would tow from eight to ten boats from three to four miles an hour, thus giving the whole carrying capacity of the canal to freight, with no extra lockage. A track built in this way would not interfere with towing by horse power, which could be used at such places as Little Falls, Cohoes, etc. Difficulty might be apprehended where the towing path changes from one side of the canal to the other, but this could be easily obviated by having a swing bridge with a track upon it to run the engine from one side of the canal to the other. Lowering the towing path slightly under the bridges would enable the engines to pass under without difficulty. In my opinion, the track should be built and the engines furnished at the expense of the State, and towing charged and collected at reasonable rates, the same as canal tolls. I think it is not too much to say that the cost of raising and grading the towing path, worn down by horses, together with removal of slope-wall and other material drawn into the canal by tow lines and tread in by horses, which has to be removed every year, would in five years equal the cost of laying the track and furnishing the engines. There is still another reason in favor of laying this track. In case a large number of boats were frozen in, by the use of a switch all the freight could be easily transferred to the railways at a slight expense. I would respectfully recommend to the Legislature that part of the canal between Albany and West Troy be set apart for experimental trials of any invention for propelling boats by steam, and that an appropriation of \$25,000 be made for testing the plan of propelling by steam on the towing path, as above stated, and that said appropriation be expended under the authority of the Canal Commissioners."

Q. Would not the increased speed of this system over horse power more than compensate for any delays at locks?

A. Yes, sir; I think the trip could be made at about eleven trips by the new system, instead of seven, as is now made.

By the CHAIRMAN.—What would be the difficulty in meeting other boats coming in other directions?

A. If the track were on both sides of the canal, there would be no difficulty at all.

Q. With the present width of the canal, two boats passing, moving at that rate stated, and loaded, the water would naturally pile up and the boat would settle in the water, would there be depth enough of water then?

A. I never took that into account ; if there was any difficulty of that kind, they could slow up when they came within a quarter of a mile of each other ; I don't think there would be any trouble in that direction ; you can tow a boat in a fleet with less power than separate. The forward boat creates a vacuum and the next boats drop into it, and all the boats appear as though they were running down hill.

Q. Then you would not maintain your seven feet of water ; there must be a very serious displacement of water in that case ?

A. This water don't get into the vacuum till the other boat follows it up ; the second boat don't displace so much water.

Q. If it drops into the vacuum, it certainly displaces a portion of water ?

A. Yes, sir ; but not a large amount gets in before.

By Mr. CRANE.—Would there be any trouble if the locomotives were under the same superintendent, and had orders, when at a certain distance, to pass each other at a certain safe rate of speed, would there be any difficulty in executing such an order ?

A. Nor a bit.

Q. The man who runs the locomotive has his orders about slowing his speed when meeting another, at whatever speed is necessary ?

A. Yes, sir ; if there is necessity for it.

By the CHAIRMAN.—The question I asked is merely to get at the facts.

A. I am glad the question has been asked, for I never thought of it, and there may be something in it.

Q. The problem is, cheap transportation by increased speed, if vessels are obliged to slow down when meeting each other, it would not be a very great increase ?

A. Where boats come in fleets they would not meet often, but if they came singly they would meet much oftener.

By Mr. SHEARD.—Would it be necessary to go any slower when you pass a boat in towing by steam or in towing by horse?

A. No, sir.

By Mr. CRANE.—In going back with a light loaded boat, is there any difficulty in going a speed such as can be given by three or four horses with perfect safety to the canal?

A. Not a bit.

Q. Three-fourths of the boats return empty or with very little freight; an hour saved in going back light loaded is just as good as an hour saved to the boatman coming down, if he makes a round trip, is it not?

A. Yes, sir.

Q. If he can diminish the cost as stated at ten cents, making eleven trips instead of seven, then the boatman has got something better than if you took all the tolls and gave him a free canal; do you concur in that view?

A. Yes, sir; there is a new system of canals in Canada being built so that vessels can take 2,000 tons of grain from Chicago to London, and unless there is something done to lessen the cost of transportation to New York through this canal, the result will be that Montreal will be the great seaport of the great West.

By the CHAIRMAN.—Have you seen those canals in Canada personally?

A. Yes, sir; I have been there.

Q. There are one-half the number of locks on the canals from Buffalo to Albany?

A. Yes, sir; in my calculation of eleven trips instead of seven, I have included all the locks; though I should not have included more than fifty, I have made my calculation including the weightage all the way from Troy, which ought not to have been done.

Q. With that calculation, could you make eleven trips instead of seven?

A. Yes, sir; eleven and a half.

Mr. CRANE.—When I was in Lockport a year ago last fall, Mr. Jackson asked how I would get through Lockport ; I asked why not have hydraulic pressure applied there ; he said, because we have always done this way. The most difficult thing that I have met as a railroad man in drawing boats is in the cost of draught ; boats will have to wait for water. There is a point on your canal where they cross from Syracuse ; I learned from Mr. Jarvis at Rome that the water has come in at Rome to fill up this vacuum ; I asked if there was any trouble in putting a guard to prevent it being done ; he said "no, but it never has been done ;" but why has it not been done, it is only because our father did so before us.

Q. Is there not plenty of water on the level between Syracuse and Oswego river ?

A. Yes, sir.

Q. Could not an engine be put with a rotary pump to pump the water in when necessary ?

A. It could be done, and this railroad company need not have one week's delay in making such arrangements ; it is practicable.

By the CHAIRMAN.—Don't you find the same difficulty in the Montezuma level ?

A. I have had nothing to do with it ; there has been a project of deepening it there.

Q. Would you not find some difficulty in laying your tracks through large cities ?

A. I have examined the subject at Utica, Syracuse, Rochester, and all the leading cities with a skillful engineer, and by crossing from one side to the other, it can be done without interruption ; you have got to cross the canal and use your tracks for double tracks at certain places, and use your telegraph wires, but there is not one point where it is not perfectly feasible to accomplish.

Q. Where and what is the longest space of distance where you would have to cross and continue on one side of the canal ?

A. At Little Falls, for about one mile, we may have to put all four tracks on one side ; but I am not prepared to say positively that we should have to do it ; I would want to take the State Engineer and State Superintendent of Public Works, and

with the best means at hand and the best talent, determine what could be done, and put it on paper and bring results to the Canal Board ; it could be done so cheaply that it is simply marvellous that it has not been done before.

By the CHAIRMAN.—How would you get by these distances ?

A. By two tracks ; locomotives on the banks of the canal, built to go either end foremost.

Q. Then you want turning tables ?

A. No, sir ; the engines are built to go either end forward ; they have them now of that kind in Colorado ; they are building them in Philadelphia ; there is no practical difficulty in the way ; it is not such a line of railway as the Central, running at thirty or forty miles an hour, but it is feasible and practicable ; I didn't know before that Mr. Buckley had made any such report as we have heard.

Mr. BUCKLEY.—If we can lay those tracks down cheap and tow our boats cheap and almost double our speed, we can compete with the Canada canal.

Mr. CRANE.—What I want to say is this, that the larger class of vessels on Lake Erie from Buffalo to the West, where you have got breadth of beam as well as depth of water, a vessel from Buffalo to Chicago that will put its contents of 1,200 tons on board of five canal boats can be worked so cheaply in this way that we propose, and no railroad can be worked so cheaply as from Chicago to New York City. We have all a deep interest in the great water ways—all New England has an interest in them.

By the CHAIRMAN.—What do you think it would cost by the ton from Buffalo to Albany by this system of towage, taking everything into consideration, say on the average of towing boats with a capacity of 100 tons ?

Mr. CRANE.—On the ocean between New York and Liverpool, 4 to 5,000 ton ships would be a mill a ton a mile. That will support the vessel and no more. From Buffalo to Chicago it takes two mills a ton per mile on just such vessels as navigate the lakes to-day, without profit or loss. The next cheapest system is a line of railway, such as the N. Y. Central, carrying

large quantities of freight at a speed of eight miles ; $3\frac{1}{10}$ mills per ton per mile will keep it in repair without profit or loss. Your canal as it is run now costs five mills a ton a mile, exclusive of tolls.

In order to get at what the railroad costs as compared with this system and the mule system, it is necessary to get at the actual cost by each system.

Mr. Crane, Mr. McAlpin and myself worked it out in this way. Assuming all the boats to carry 240 tons from Buffalo to Albany, what will it cost boats of this capacity to do the work ? Of course if your boats are of a less tonnage, it will cost you more. The advantage in the value of the trade will give you a new dollar for an old one, provided the State keeps the canals in repair. Those statements ten years ago were called in question, but what is the result ? Four boats on your canal go to the dead-house for every living one put on. Why ? Because the boatmen make no money. I interrogated boatmen at Schenectady, who came from Buffalo, in regard to the tonnage cost of working the boat, time taken on the journey, amount of money he made, and I found that the man, though he said he had his wife and child to help him run the boat, he made no money at the end of the year, the reason being that the railroad rates in summer ran him to the wall ; he had only a little time in the fall when he could make any money. He estimated the cost of the mules and boys at about 18 cents a mile down and back. Another said it cost him 16 cents a mile down and back, and the lowest amount I ever knew to be paid for this was paid by a man who said he was brought up on the canal himself, and who said he could get the work done for 13 cents a mile. I asked him if he took into consideration the value of his mules, and was told that he had none to begin on.

By the CHAIRMAN.—Suppose the boats going into a lock should spring a leak, what would be the result according to your system ?

- A. Why they would stop over one train and take the next.
- Q. Suppose the boats were towed in a drydock, what then ?
- A. They would tow them in and tow them out again—take all the contingencies. If your Canal Commissioners acted right, they would say to us. If you are going to do the work, you must do it all, but when a boat gets to Albany we have nothing to do with it.

Q. When he gets to Buffalo, how is it ?

A. We arrange with the tug-man to make up the trains with every five boats, and we start night or day from the time navigation opens until it closes. If we start from Buffalo, we will see them through, or if we start from Syracuse, we will do the same thing.

The CHAIRMAN.—You think that ten cents per mile is a fair ratio between this system and the other one ?

Mr. CRANE.—We do for ten cents what it costs twenty cents to do now.

The CHAIRMAN.—By the present system it costs \$1.59 per ton for moving freight from Buffalo to Albany ; by this new system of towing, assuming 100 tons to the boat, it would cost 33 cents. I want to ask you if that is a fair ratio between the two charges in your opinion.

Mr. CRANE.—There is not a boat going through your canal, empty or loaded, small or big, that don't cost over 13 cents a mile to draw it. If a man wants to make money by carrying freight to Albany, and sees fit to carry 100 tons where he ought to carry 240, he deserves to fail.

The CHAIRMAN.—You get the same pay for towing a heavy boat as an empty one ?

Mr. CRANE.—What is the effect of this ? It is a terrible thing. You are dealing with great problems with 10, with 100, with 1,000 tons of freight. Will you block up your canal with something that is going to destroy your business ? Our object is to make transportation so cheap that a man cannot afford to put his horse on the canal.

Mr. SHEARD.—Thirteen cents a boat a mile only covers the cost of the mules and the boys—it has nothing to do with the hands on the boat. It covers only the amount of mules, horses and boys. You may turn around and see how many boats there are and how many hands on the boats. If it costs \$4,000 a day to work them, what will it come to at ten cents a boat a mile to do the same work ? It will come to less than half ; in other words, less than \$2,000 a day for

the boatmen to do it than the present method at \$4,000, without taking into consideration the speed.

THE CHAIRMAN.—Your intention is, that the State shall eventually be the owners of the road?

A. Yes, sir; we will make a bargain with your Canal Board that as fast as the rails are laid they will be the property of the State.

THE CHAIRMAN.—This is to be a railroad?

A. Yes, sir.

Q. You stated that cities compete where railroads combine?

A. Yes, sir; but New York to-day owns no railroad, Boston owns no railroad, and I am at work to see how the State of New York can in ten years have this railroad, and own it from Buffalo to New York city, that shall give it power to say how much you will charge for freight without having any legislation, because that thing done in good faith will do its work effectually.

THE CHAIRMAN.—It is your desire that the Canal Board shall regulate the freights from time to time?

MR. CRANE.—The rates are fixed at a limit beyond which they cannot go.

THE CHAIRMAN.—Can't they deviate from the charge?

MR. CRANE.—The State owns the whole of it.

THE CHAIRMAN.—Our trunk lines originally had their rates fixed one way, but other legislation struck the rates off; why not suppose that in this case other legislation can lower the rates?

A. Yes; and we can do the rates so cheaply that Baltimore cannot come down to a point to do it and pay interest on \$50,000,000.

MR. SHEARD.—How do you propose to get from here down to New York?

A. I am going to show that, by witnesses, it would extend itself to the State line to New Jersey, reaching the Jersey shore with very little money; a railroad from Buffalo to Albany with-

out an outlet to New York is not a paying institution. If you put this line at $1\frac{1}{2}$ cents a mile and ticket a man through to New York, then you give him something, and all the old railroads will turn around and say we can do as much as they can.

MR. SHEARD.—Why didn't you build the road on the proposed route of the south side of the Mohawk?

A. The land damages alone between here and Buffalo would build the whole railroad upon the canal.

MR. SHEARD.—You can build so much cheaper on the canal so as to make the comparative cost of running it below that of any road that is now built, or that can be built in the future?

A. Yes, sir.

Q. I take it that your motive is to increase the traffic in New York?

A. The motive is to cheapen freight traffic by utilizing the Erie and Oswego canals; that the Welland canal will be outbid, and Buffalo and Oswego will have an outlet in the winter as well as in the summer.

MR. SHEARD.—What is the maximum tonnage that you propose to tow on this canal to provide for the sinking fund?

A. We could safely count on the Central doing 7,500,000 tons a year; we expect to take about one-quarter of the freight of the Central; that is all we expect to get.

THE CHAIRMAN.—The canals carried about 5,000,000 last year?

A. Yes, sir; and the Central road carried over 7,000,000 tons of freight.

Ex-Canal Commissioner Darius A. Ogden was then called and questioned by Mr. Crane:

Q. Did you hear the testimony of ex-Canal Commissioner Alex. Barkley?

A. I did.

Q. Have you listened to the statements that have been made by myself, and, if so, what are your views in relation to this subject?

A. I concur entirely with the views as expressed by Mr. Barkley, and I think the plan both practical and feasible; and,

in my judgment, it is the best thing to be done. It would save the State annually a large sum in the repairs upon the canal banks. The men employed by the railroad in taking care of their tracks will furnish a set of watchmen along the line of great value to the State. In case of any break in the canal, the use of the railroad, with their gravel trains put in requisition, will enable the work to be done in less than one-half the time and cost, and I give the plan my most hearty indorsement.

Adjourned until 3:30, March 20, '79.

SECOND DAY'S HEARING.

THURSDAY, March 20, 1879.

MR. CRANE.—I intended to have Mr. Jarvis here as a witness, but he is unable to be here to-day ; I will read a letter which I received from him :

LETTER FROM JOHN B. JARVIS.

ROME, N. Y., 17th March, 1879.

EDWD. CRANE, Esq.,

DELAVAN HOUSE, ALBANY, N. Y.

Dear Sir:—Mr. Frothingham called on me last Saturday with your request that I should appear on Wednesday, (19th) before Assembly Committee on Canals, in reference to the project of towing boats on the State canals by means of locomotive steam.

I would go to Albany for this object as soon as any other, but my age admonishes me to be cautious, and at this season it would not be prudent for me to do so.

As I have fully stated my views in my article, published in the *International* of May last, I do not see any necessity for me to go before the committee. My opinion is there fully set

forth, and I could only say subsequent reflection has confirmed them.

I can see no method by which economy in canal transportation can more effectually be secured between the lakes and the Hudson.

I notice the State Engineer recommends measures to give one foot additional draft to the canals ; this will be a valuable improvement.

I understand he is also engaged in measures to improve the handling of the locks on the canal, by which an important saving will be effected in the time for boats in passing the locks.

These are both important to canal economy, and with towing by locomotive engines will secure, in my judgment, the necessary economy to enable boats to compete successfully with rail transportation, and secures to the canal the great traffic of the lakes.

I have no faith the people will long sustain a free canal by taxes, even if it were made a constitutional provision. The only way is to put the canal in a condition to take care of itself.

We are now borne down by taxes, and this addition will be unsatisfactory.

Very respectfully yours,
 (Signed.) JOHN B. JERVIS.

Mr. Barclay, before leaving last evening, sent me a note which I wish to read :

LETTER FROM ALEXANDER BARCLAY.

EDWD. CRANE, Esq.,

Dear Sir:—At your request, I give you the particulars of my experience in towing a fleet of boats in the Erie canal.

In 1873, about December 20, on the level west of Schenectady, I made up a fleet of 23 loaded boats in one line, connected by short lines, and attached to them three steam tugs and fifty-three pairs of horses, for the purpose of breaking through the packs of ice which accumulated at points in the canal and obstructed navigation.

The ice was a foot in thickness, and had been broken up by the ice-breakers.

Whenever we approached a pack of ice we increased our speed from two to three miles per hour.

At all times boats passed around the curves, and some of them were very short ones, without difficulty.

They followed one another just as a train of cars does on a railroad. The teams were placed off the forward tugs, and were attached to it by a heavy line. This was necessary to keep the forward tug straight in the canal, as it would sheer without them on account of the ice.

The boats in the train did not seem to require much steering. The forward boat and eight or nine others had steersmen on them. In a fleet of five boats to be towed by a locomotive, I think two men, one each on the forward and rear boats, would steer them.

In the experiment of towing the loaded lumber boats between Troy and Albany, by the steam wagon, when they were going at a rate of $3\frac{1}{2}$ miles an hour, I took particular notice of the wave and it was not more than from 4 to 6 inches.

Boats could be built for this kind of towing a little sharper in the bow ; they would tow easily, and in that case I think the wave would not be higher than from 3 to 4 inches. The water, in my opinion, can be raised in the canals 6 inches at a very small expense, and this would be a great advantage in cheapening transportation.

I very much fear that the Canada canal system will work permanent injury to the city and State of New York unless we can increase the capacity of our canal and cheapen transportation charges lower than by any other route.

Very truly yours,

(Signed) ALEXANDER BARCLAY.

March 19, 1879.

M. ALLEN called :

Q. Where do you reside ?

A. I am living here in the city at present, at Albany.

Q. What is your occupation ?

A. Civil and mechanical engineer.

Q. You heard the statement of Mr. Barclay, yesterday, with regard to locomotive drawing boats ; the experiments that were made ?

A. Yes, sir.

Q. Will you state to the committee, as engineer, as to the drawing with locomotive referred to by Mr. Barclay ; and also state to the committee whether, in your judgment, there is any impracticability of drawing boats with locomotives, in the fact of it being diagonal to the boat ?

A. About the experiment that was made at that time, the facts are the same as stated in that report, or substantially the same ; and, as far as the practicability of towing boats by means of a locomotive on a track on the towing path, I don't see any difficulty about that. The only objection I see would be the side draft on the engine ; and, as far as that is concerned, it can be easily overcome, by elevating the inside rail, so that the weight of the engine would overcome the side draft. Of course the rails would be parallel with the canal, so that the engine tips very little.

Q. From the canal ?

A. Yes, sir ; without overcoming the side draft, if placed level, it would have a tendency to pull the wheels against the inside rails at all times.

Q. Have you any question as to the feasibility and the power of the locomotive to do and perform what is claimed for it in drawing boats ?

A. No, sir ; no question whatsoever.

Q. There is no question ?

A. None but this : I think the bows of the boats would have to be modified a little from their present form ; they would have to conform more nearly to what is called the sharp bow boats ; originally the boats of the canal were called , or something of that kind ; then they were changed from that, and we have what is known, in the scientific way of speaking, the course of quickest descent, or the course upon which there would be the least friction upon the water passing along by that course of quickest descent on approaching it, something the same as the arc through which the pendulum moves by making what is called the cycloid arc ; in making the body of the boat conform as near as practicable to that, you get the least

friction of the water, and consequently there is less danger of having your wave in front of the boat.

Mr. SHEARD.—Couldn't you change that arc, or would you have to draw an angle from the bow?

A. No angle.

Q. Wouldn't have to bend it so much as that?

A. No, sir.

Mr. HURD.—Are you a practical engineer?

A. I am, sir.

Q. Have you ever had any experience in towing boats in that way?

A. No; I can't say that I ever had; it is just an experiment; all the experiments I ever had anything to do with is the one stated in that report appended to Mr. Barclay's report.

Q. Why did you speak about that side draft if you never had any experience in it?

A. That reduces itself to a mathematical problem, as well as by experiment.

Q. Then you don't know as to its practicability—merely as to the theory as an engineer?

A. The theory would be this: The same idea would come in that we have in keeping an engine on the track in going around a curve; a certain force acts to carry it off, run off the curve, and another force would have to overcome that by elevating the outer rail; this force in the rear would act in an inverted way, but it would be about the same thing.

Q. Suppose an evener were placed on the end of the engine, and a rope attached to the very end of the evener, and the other end fast and drawn from a point from that locomotive, wouldn't you get a direct draft—wouldn't an evener placed on the end of that make a direct draft almost?

A. You couldn't always get a direct draft unless your evener reached out parallel with the line in which the boat was traveling.

Q. Suppose that evener were at the further boat from the locomotive, how much could you reduce that side draft?

A. Just in proportion to the length of the evener.

Q. Is it simply a mechanical matter?

A. Yes, sir.

Q. Simply a question of mechanical skill?

A. Yes, sir.

Mr. CRANE called Mr. Ames of Oswego city.

. Mr. CHENEY AMES said: I shall say what I have to say very briefly. I noticed in the papers that yesterday from this committee came a report equivalent to a recommendation of an amendment to the Constitution, by which the canal tolls could be entirely abrogated. That being the case, who then has got to support the canals? Is it those who use them, or is it we who build them? Is it not a fact that the citizens of the State of New York have built this canal, and are now asked by foreign States to maintain this bridge, that their commerce may pass over it at our expense? Now if that is not the situation of things, then I have not comprehended it.

Now, then, if we have got to be the carriers of the commerce of the East and the West, and from Europe to the Pacific, let us seek the cheapest way and method by which it can be done.

If I correctly understand this bill, gentlemen, you need not amend the Constitution to get a cent off from the tolls that are now charged between Buffalo and Albany. The difference in the towing of that canal boat that carries 8,000 bushels from Buffalo to Albany is that reduction of one cent; but if you wish to do still more, then abrogate the tolls upon the canals and you will save two cents a bushel. When you save two cents a bushel from the present price you have secured the commerce of the East and the West to the canal route. The railroads cannot afford it. If these are the facts, this proposition accomplishes the object.

Suppose you recommend an amendment of the Constitution, and it goes to the people, at the same time giving the bill which Mr. Crane has presented, of the two propositions which would they take? Will they take an abrogation of the tolls by which they are to be burthened with the maintenance of the canals, or will they take the bill which does the thing without any abrogation of the tolls, or without taxing us any further for the support of commerce?

This, gentlemen, appears to me so simple that he who can add two and two can understand it.

Again, you have appointed a committee to go over the State of New York during the intervention between this and the next

session of the Legislature, to investigate the railroads, and to see when, where, and how they make these extraordinary charges upon local freight business ; it costs me as much to send a barrel of my flour to Boston from the city of Oswego as it does to send a barrel of flour from Chicago to Liverpool. The same combination that carries my flour, carries that to Liverpool.

Now, gentlemen, where is the justice to the people of the State of New York in this transaction ?

I have known that the Legislature has time and again endeavored to pass a pro-rata bill, by which justice should be done to its own citizens who have granted the franchise over which the western travel and commerce comes, and which has made the western prairies the value they are to-day. It is our railroads and our canals that have done it. Now, gentlemen, pass this bill, and you have passed the pro-rata ; you have abolished discrimination, accomplished the object desired, which never could be done and never will be done in any other way, for we have tried it year after year. Pass this bill, and pro-rata is a fixed fact. Again, at the close of the season, there is a great accumulation of grain in the warehouses of Buffalo and Oswego, which must go forward, and when the canals close there is no longer any competition to railroads. We are charged 30 per cent. more increase in freight than before. Pass this bill, and *that* is done-away.

Now, gentlemen, if this bill accomplish pro-rata ; if this bill evens up commerce, as is proposed, without any call upon the State of New York at all, or without any call upon the stock-holders beyond those that are willing to make the investment, why is it not wisdom on our part to give this privilege to those who are willing to take the responsibility upon themselves, and do for the State what the State cannot do for itself, and what it has tried and failed to do.

These propositions appears so plain, so distinct, so complete in themselves, that I cannot see any objection to allowing them. You are right in your theory in regard to some points in this question. How is it to be done ? That I am not going to tell you. I do not know ; I only know, in general terms, that those who have studied this question, and studied this matter, look upon it favorably. I am now told that all difficulties are so removed that it has become an easy matter.

Again, this is an age of improvement : you see it in all directions and on every hand. Here lies your old canal, with very little improvement since the day it was built, except that it has been enlarged in its capacity, and is now capable of doing double the amount of work it was then. I will not detain you much longer. The State of New York, the United States of America, are ahead of the world in all the advancements that tend to the improvement in science and mechanism, and every other thing that tends to promote the happiness of man and the growth and prosperity of a country. That honor was accorded us in the Exhibitions at Philadelphia and in France. Now then shall we sit down here and say we are done, and that we can make no further improvements unless we tax ourselves with the means necessary to do it. If the science and improvement of the day and of the age can be seized upon to advance commerce, to improve your canals, and to even up the extortion of railroads, is it not becoming for us to do it? I should like to be one of the committee to make a report in favor of this great advancement. I would like to have the privilege of having some hand in it ; for it does seem to me that this subject is of sufficient importance to draw the attention not only of your honorable selves, but of the large community which is interested, and which has been interested, and who are ready to stand by you in a favorable report of this matter. I say it was well set forth by Mr. Crane that it was indispensable that we should make an improvement in our commercial enterprises in order to compete with and secure the advantages which are going to the North and to the South. These improvements are going on and constantly moving. I have here (the gentleman here referred to a paper) a report that was made in Canada last month. You know, sir, that perhaps, in view of the fact that we abrogated the Reciprocity Treaty some ten or fifteen years ago, that the Canadians have endeavored to retaliate upon us in some way. Now, they have put a tariff upon the commodities of the United States, and they have also made a favorable report for the making of a canal from Georgian Bay to Toronto and Lake Ontario, in which it is set forth that if that improvement is made, all the products of the great West, as far south as Chicago, and from the increased trade that is to be piled up from Duluth, to a foreign market of Great Britain, will go through Canada at \$2.95 cheaper than the cheapest route

now known to navigation can transport them. Here then is an opportunity to cheapen navigation, to cheapen the great products of the West to the consumers East. If we are mistaken in this, then we should expect to abide by your decision with the grace that becomes those who have embraced a false notion. But we would be exceedingly glad to know that you in your wisdom should settle the question in regard to this bill, and if you do not feel disposed to take the responsibility of recommending it to the extent that we would do if we had the report to make and give to the Legislature, and if you are acting, as you are, for the people of the State of New York, you will find this bill would meet far greater favor among those who have the canal to support, than it would to have the Constitution amended. I am not opposed to that; but at the same time why are we burdening ourselves so much and so greatly with the millions of dollars of tax that comes upon us. Who is benefited? Not the boatman, for he has been five years trying to live by his boats and has failed. If they had piled them up and burned them they would have made money by it. Who is benefited? Why then should we be so anxious to burden ourselves with the great taxation and expenses to make free canal for the farmers of the West?

I have as much sympathy for the poor man as anybody. This measure, gentlemen, now under consideration, means more than we have expressed—more than any measure that I know of before your honorable body.

By Mr. SHEARD.—What other outlets have you from Oswego?

Mr. AMES.—None but the railroad, sir.

Mr. SHEARD.—You are not able to get a through rate?

Mr. AMES.—I might say here that when this canal is done from Georgian Bay to Toronto, when the Welland canal is completed, which will be in two years, when the largest vessels will come down, and when these canals, if built, will bring their produce to Lake Ontario, what do we want? We want them to take the property and carry it to New York as cheap as they could carry it to Montreal. Now the freight from Lake Ontario to Montreal is at four to five cents a bushel; from Oswego to

New York it is five to six cents, only losing about one and one-half cents in going to New York to take shipping there. That is the difference. You will also bear in mind what Mr. Vanderbilt is doing. He is now making contracts in the West for through freights to Europe, and the people are not benefited by it, they are not benefited to the extent of one cent. They get a little handling perhaps in the business, but the canal is the regulator, and it is the only regulator, and when this railroad shall be built, by which the improvements anticipated and accepted under it are made, we then can compete.

MR. SHEARD.—What effect would it have upon the grain business to Oswego when the Welland canal is in force?

MR. AMES.—With the tolls off the canal I do not think but what the main trade will get on the Erie canal, but what the effect will be, is yet to be determined. The Welland canal will bring the largest vessels down to Lake Ontario. The toll from Buffalo to New York is one cent and three-tenths; from Oswego to New York, six-tenths, a little less or about one-half what they are to Buffalo; if they can bring the grain down to Oswego for three-fourths of a cent more than they can carry it to Buffalo, Oswego will get some of the freight, otherwise not.

THE CHAIRMAN.—Doesn't it cost more than that to get it from Oswego by canal to Syracuse; you have to lock up all the way?

MR. AMES.—There is a heavy rise.

THE CHAIRMAN.—That has tended to make that route rather unfavorable for carrying the produce?

MR. AMES.—The reduction of the tolls on the canals has done it. In 1862 we handled as much grain as they did in Buffalo, because that could come to Oswego by Lake Erie, and the advantages were in our favor.

MR. SHEARD.—Do I understand you to say that the lowering of the tolls is prejudicial to the interests of the trade at Oswego?

MR. AMES.—Entirely, sir, commercially. Had the Constitu-

tion been fulfilled or lived up to, Oswego would have had a good business to-day.

Mr. WADSWORTH.—What do you regard the probability of breaking bulk when the enlarged canal is made through Welland, in Ontario, is it a probable fact that a larger amount of freight does go direct to Liverpool, making their partition on the lakes, or would it probably be at Kingston and Oswego?

Mr. AMES.—Well, sir, my impression from experience is that the lake vessels cannot profitably navigate the ocean, and that the ocean vessels cannot navigate the lakes. When the grain is brought direct from the far West, it is brought to Kingston, there transferred to large barges and towed to Montreal, and there again transferred for shipping. The first and original expenses of elevating can be done at one-fourth of a cent a bushel, and the advantages arising to the grain in being handled and aired is equivalent to that expense. The elevators can be made to elevate from three to six thousand bushels an hour.

*Ex-State Engineer S. H. Sweet, called and examined.
Examined by Mr. CRANE:*

I will ask you to make an estimate in detail from your own reports of your own knowledge of the cost of canal transportation as it is now carried on; also what the cost will be in transporting under the improved method proposed. Without asking questions, I would like to have you give us the information?

A. I made two calculations, one for mule power and one for towing by locomotive.

Q. Read to the committee what you have?

A. The first method is for mule power. (Witness read from paper.) The total time consumed by the present mode of towing by animal power, to make a round trip from Buffalo to New York and return, (990 miles), is thirty days, or seven round trips during the season of 210 days. The speed made on canal sections, deducting all detentions, is as follows:

Total time round trip..... 720 hours.

Deduct:

Detention in port, 6 days..... 144 hours.

On river, 4 days..... 96 "

Lockages, 72, at 30 minutes both ways..... 36 "

_____ 276 "

Total time, uninterrupted sections..... 440 hours.

Making speed eastward, 1.31 miles per hour..... 267½ hours.

And making speed westward, 1.98 miles per hour... 176½ "

_____ 444 hours.

COST WITH ANIMAL POWER.

Investment:

Cost of boat..... \$4,000 00

Cost of 4 horses..... 500 00

Cost of 4 harnesses..... 60 00

_____ Total..... \$4,560 00

Interest on investment at 7 per cent..... 319 20

Reserve fund at 7 per cent., to replace boat in 10 years..... 289 60

Repairs to boat, 8 per cent. of cost..... 320 00

Insurance on boat..... 20 00

_____ \$948 80

Crew, including board :

One captain, \$90 per month , 7 months..... \$630 00

One steersman, \$20 " " 140 00

Two drivers, \$20 " " 168 00

One cook, \$10 " " 70 00

_____ 1,008 00

Keeping and shoeing of horses..... 900 00

Reserve fund to replace horses in 6 years..... 69 90

River and harbor towage, \$60 each, x 7 trips..... 420 00

Commissions, \$25 each, x 7 trips..... 175 00

Insurance on cargo, \$35 each, x 7 trips 245 00

Warfare incidentals, \$7 each, x 7 trips..... 49 00

Total cost for season..... \$3,815 70

Tons transported :

Eastward, 230 x 7	1,610 tons.
Westward, 57½ x 7	402½ "
	— 2,012½ tons.
Cost per ton moved, Buffalo to New York	\$1.89.6
Cost per ton per mile	3.83 mills.
Cost of a bushel of wheat	5.688 cents.
Elevating charges in New York	0.50 "
Trimming cargo per bushel	0.15 "
	—
Total cost per bushel, with transhipments . . .	6.338 cents.

COST WITH LOCOMOTIVE POWER—ERIE CANAL.

By proposed method of locomotive power, on a basis of 3 miles per hour between the locks going East, and 4½ miles per hour going West.

When the locks are in good condition and boats arriving in trains, they can be passed in 5 minutes each, or 25 minutes per train of 5 boats each.

Mr. SHEARD.—Let me call your attention to quite a discrepancy in figuring the time of running a boat ; you figured 30 minutes for lockage, 15 each way—when you lock by locomotive it only takes 5.

WITNESS.—A boat is very indifferent about getting in and out of a lock ; they sometimes have to swell them out ; there may be a temporary trouble in the water.

Q. I understand the difference of time in getting in and out ; but I do not understand why it is necessary to estimate 15 in one lockage and 10 in another.

A. That is about what they average in a season.

Q. Does it not take from 3 to 5 minutes to let the water in ?

A. No, sir ; in 1847 to 1850 experiments were made where you could lock them in 4 minutes ; I have read in some report the time occupied in doing that which may be a little over 4 minutes ; that is by experiment on a lock in good condition ; we did it as rapidly as we could.

Q. Does it consume from 10 to 15 minutes to put a boat through the lock, taking everything into consideration, the condition of the locks, the scarcity of water, etc.

A. That is the average, from 10 to 15 minutes ; the reason I call towing by train, it is presumed that these locks will be put in good condition, managed in a little different way, and probably be of more benefit to parties passing boats.

Q. It depends upon the kind of a lock-gate you have ?

A. Yes ; and another thing, the difference in lift lock ; some locks have a 3-foot lift, and others a 10-foot lift ; and the drop-gate has facilitated the lockage very much.

The CHAIRMAN.—There is no guarantee that the State will perfect that lockage in the case of towing by locomotive power.

Mr. CRANE.—In the State, as it is now, it is no particular business of anybody ; the State cares nothing about it ; the starting of a boat out of the lock by locomotive power will do it in one-third of the time occupied by horses, from the time the gate is open ; that is the expectation ; I think it is fair to put it as the witness has put it.

WITNESS.—From my experience I know the boat can be locked, when the lock is in fair working condition, and the boatman attentive to his business, there is no trouble in passing a boat in 5 minutes ; it can be done in 4 minutes.

(Witness continued reading from paper as follows):

The time consumed in making a round trip from Buffalo to New York and return, would be as follows, with locomotive power :

72 lockages East and West, 50 minutes.....	60 hrs.
700 miles of canal, average speed $3\frac{1}{2}$ miles per hour....	187 "
4 days in port.....	96 "
4 days on the Hudson.....	96 "
Total hours.....	439 hrs.

Say, total days, $18\frac{1}{2}$, or $11\frac{1}{2}$ trips per season of 210 days.

COST OF TRANSPORTATION.

Investment same as boat with horse-power.....	\$4,560 00	
Interest on investment, renewal, reserve fund, repairs and insurance, same as horse towing.....	\$948 80	
Same crew and expense, except drivers.....	840 00	
Total.....	\$1,788 80	
River and harbor towage.....	\$60 each trip.	
Commissioners	25 "	
Insurance on cargo.....	35 "	
Wharfage, etc.....	7 "	
	\$127 by $11\frac{1}{3}$ trips....	1,439 00
7,933 miles at 10 cents.....	793 30	
Total cost per season by locomotive.....	\$4,021 10	

The tonnage transported during the season (burthen of boats same as horse boats East and West) as follows:

230 tons eastward $\times 11\frac{1}{3}$ trips.....	2,606 tons.
57 $\frac{1}{2}$ tons westward $\times 11\frac{1}{3}$ trips.....	651
Total tons removed.....	3,257
Cost per ton moved from Buffalo to New York, 495 miles.....	\$1,234
Cost per ton per mile.....	2 $\frac{1}{2}$ mills.
Cost per bushel wheat moved from Buffalo to New York	\$3.70 Cen
Elevating charges in New York.....	.50 "
Trimming cargo.....	.15 "
Total cost per bushel exclusive of tolls.....	\$4.35 Cen
Thus saving 2 cents a bushel by the latter method.	

TOWING ENGINE.

The general plan of engine selected as the best for towing the boats is a back truck, double under tank locomotive, weighing

39,000 lbs.—35,000 lbs. on the drivers, with cylinders 12 by 18 inches, and 3 feet to 40 inches diameter of driving-wheels. Its performance of duty is guaranteed as follows, viz.:

Its tractive power is 8,000 lbs., and will haul on a level 800 tons, and up a grade of 40 feet 260 tons, and up a grade of 100 feet 115 tons.

The traction by formula (that generally used) is $(125 \times 12^2 \times 18)$ 8,100 lbs., being about the same as that guaranteed by the manufacturers. In the above the effective pressure of steam on the cylinder is taken at 125 lbs. per square inch, diameter of driving wheels at 40 inches.

The box cars on a three-foot gauge road generally weigh about six tons, and will carry ten tons of freight, making with car and load 16 tons.

Therefore an engine of the above power will haul on a level 50 loaded cars, or 500 net tons.

To haul the contents of the five loaded boats, 1,200 tons, over the level road, would require, with this power of locomotion, $2\frac{4}{5}$ trains, as the weight of the cars and load would be 1,920 tons.

Many of the narrow gauge engines will haul 11 tons up a grade of 340 feet per mile. One engine working upon the Mineral Range railroad hauls $62\frac{1}{2}$ tons over a grade of 211 feet per mile. This engine weighs 20 tons. The following shows the capacity of narrow gauge engines :

Will haul 26 tons over 193 feet grade.

"	"	21	"	"	247	"	"
"	"	15	"	"	265	"	"
"	"	6	"	"	385	"	"

The cost of running a locomotive of power to draw five boats at a speed of three miles an hour, including repairs of track, would be about \$16 to \$18 per day, or from $5\frac{1}{3}$ to 6 cents per mile per boat.

The lowest cost of towing by present method is 20 to 25 cents per mile, which, at 20 cents upon the mileage of one round trip, amounts to \$140.

If towed by locomotive power at the price of 10 cents per mile, the cost per round trip (700) miles would be \$70.

Saving in towing one trip.....	\$70 00
" " " 7 ".....	490 00
" " " 11 ".....	770 00

By making 11 trips per season with locomotive power instead of 7 by animal power, the carrying capacity of the canal will be increased 7 to 11.

In towing boats through the canal *single*, at a speed of three miles an hour, the resistance is equal to 4 lbs. per ton of freight, and at two miles an hour, about $\frac{1}{2}$ lb. Upon a 3-foot gauge railroad the resistance, at a speed of eight to ten miles an hour, is equal to from 10 to 15 lbs. per ton of freight; deducting friction of the locomotive and loss by angle of the towing line, and it leaves an available traction power of about 7,600 lbs., and, as the average force exerted by the horse towing does not exceed 160 lbs., the above locomotive represents the towing power of about 46 horses going at a speed of two miles an hour.

The resistance (maximum) towing a loaded boat at two miles an hour, is 430 lbs., hence at this speed a locomotive will tow about 17 *boats loaded*.

The resistance to a *single* boat at the speed of three miles an hour is 1,060 lbs., hence at this speed a locomotive will tow, say 7 loaded boats.

The dead weight of cars on a narrow gauge (maximum), to paying freight is as 6 to 10. The weight of a boat is 63 to 65 tons, therefore the dead weight of transportation by boat is 1 to $3\frac{3}{4}$ tons of freight. About 20 per cent. of the resistance is saved in towing boats in trains of say 5 boats each.

Total maximum resistance towing 5 single boats at a speed of 3 miles an hour is equal to 5,300 lbs., same in train, say 4,200 lbs.

Q. In this computation you estimate the cost per ton from Buffalo to New York, at \$1.90 by animal power?

A. Yes, sir.

Q. And \$1.23 by locomotives?

A. Yes, sir.

Q. That is, you estimate they will go, on an average, $3\frac{3}{4}$ miles an hour?

A. Yes, sir.

Q. You have been acquainted with canals as engineer?

A. Yes, sir; I have a recollection of some report which Mr. Fay made upon this same subject, or a similar matter with regard to the introduction of an improved system of towage, and he was in favor of some improved system, and he gave as his judgment that it would be of advantage.

Q. That it would be expedient to tow faster than two and a half miles an hour?

A. That depends upon the method. If we employ the automatic power, the screw propeller, you lose from forty to sixty per cent. by the screw; but by towing by adhesion you gain all that.

Q. Would not the depression at the bow be less when the power is in the stern than it would be by adhesion?

A. I think it would; but if you will take occasion to look over the report of the commission during the Baxter experiments, you will find loaded boats of 200 tons made three and four miles an hour during the experiments, and very generally three and eighty-five hundredths miles an hour. I do not know of any experiments myself, but I learned of those who had made experiments when I first came on the canal, that by a speed of six to seven miles an hour a large swell is created and carried along at the bow.

Q. In towing a boat at moderate speed, when you accelerate that motion, the water tends to push forward, doesn't it?

A. There is just where I would like to say that it don't seem to amount to a great deal until you get up a speed of six miles an hour, then the swell seems to rise in front and is carried along with the boat, and is a great drag on the boat.

Q. It increases by increments, but you cannot fix any arbitrary points at which it commences?

A. I think it is about six miles an hour when they get that momentum.

Q. Would not the tendency be to displace that water; a boat drawing a certain depth of water would then come near the bottom; wouldn't that be the tendency?

A. No; the tendency is to recover the displacement, and the velocity in overcoming this displacement produces a current in

the rear of the boat, and assists the boat in tow to pass easily ; it leaves no depression for the pulling boat to encounter.

Q. You say you have a tow of five boats loaded, they load them down to within about six inches from the bottom of the canal ; you pass along at the rate of four miles an hour, and to a certain extent the water is displaced and the first boat passes ; now comes your next boat ; you do not suppose all the water displaced has suddenly got back into the vacuum of that first boat ?

A. It has not completely, perhaps.

Q. Then the depth of the water is not as great as it was ? now we come to the 3d, 4th and 5th boat—do you think there would be seven feet of water for the fifth boat to travel in ?

A. I don't know that there would be two inches difference ; it is the counter-current that runs in to fill the displacement in the rear of the boat and does fully recover its level within perhaps three feet of the stern of the boat ; that is at the rate of three and one-half miles an hour.

Q. At what rate of speed is it safe to pass tows ?

A. About two and one-half miles an hour ; I don't know but three miles an hour they could pass.

By Mr. SHEARD.—Q. Speaking of this vacuum and displacing of water, would not five boats being in such close connection have a tendency to raise the depth of the water in the immediate neighborhood of these boats as much as the vacuum would cause it to recede ? Take, for an instance, a bowl of water, and drop an egg in ; that raises the level of the water ; so as regards these boats being close together, would not a displacement of the water by the bodies of the boats contract the vacuum principle which our Chairman has explained ?

A. It seems to restore itself almost completely within a few feet ; if the boats were about within 5 feet of each other, almost completely, that is from experiment ; from theory it is a very easy thing to calculate ; in practice it seems to restore itself by a counter-current in the rear.

Q. If the level was just as long as a boat, if it measured $6\frac{1}{2}$ feet of water without a boat in and you let a boat in.

A. You raise it in the amount of the displacement ; it has no bearing in a case like this, for it escapes along the sides of the boat ; you are speaking of a confined bowl ; with the boat it escapes by a current along the sides and under the boat, fills

and follows up in the rear ; it has no such relation at all as in the bowl. The greatest depression is at the centre of the boat, and not at the rear, as generally supposed.

By the CHAIRMAN.—Q. In moving a train of boats in that way, the water passes along the sides and returns in the wake of the boat in time for the next boat ?

A. Yes, sir ; that is the law and the result of experiment ?

Q. What is the width of the prism ?

A. It is 70 feet on the surface.

Q. What is the maximum width of a canal boat ?

A. About $17\frac{1}{2}$ feet.

Q. You say boats could pass about three miles an hour ?

A. I presume they might, perhaps two and a half an hour ; I don't know but they could three.

Q. For instance, if they were passing each other at that rate of speed, we have taken up in the boat 35 feet, the canal at the bottom of the prism is only 56 feet—you only have that for the water to pass back—do you think it would be practicable to pass two boats at that speed—would they not drag on the ground ?

A. No, sir ; I don't think it would make a difference of over three inches in the reduction of the water in passing at the rate of two and a half miles an hour.

Q. In passing two fleets of boats, five in a fleet, at the rate of three miles an hour, there would not be more than three inches difference in the height of the water between the front boat and the rear ?

A. I don't think there would ; I have never figured upon it ; I judge from experiments ; it is a matter of judgment.

Q. What division were you on ?

A. I was located on the middle division for two years as resident engineer.

Q. Don't they have considerable trouble on the Rome levels in dry time ?

A. The principal trouble has been on this level ; there is ample supply if the water could be evenly distributed, but the winds drive it back east, and to counteract it we constructed a reservoir to restore west end in the case of winds ; at constant high winds I found at Syracuse it would lower the Syracuse end sometimes six inches and pile it up toward the west end of the level.

Q. Did they have trouble with the Montezuma level?

A. No; along the Jordan there is a place where they are deficient, but they are not troubled as much as long level.

Q. Sometimes on the eastern end of the long level?

A. Yes, sir; the reservoir has been constructed on the east end for the purpose of overcoming that depression there.

Q. So that probably in three months of the year you would not have more than six feet of water?

A. The greatest depression was six inches that I ever found, that was before the reservoir was constructed, but now I do not think they are troubled over 2 or 3 inches?

Q. Is not the maximum capacity of the prism of the canal boats of 240 tons—that is to say, in the present form of construction of boats, that is all the boats will take?

A. Yes; that is forcing the prism, too.

Q. That is taking into connection the 7 feet of water—you say in three months of the season you have no more than 6 feet of water, in your estimate there you can carry this produce to New York for \$1.23, but you have estimated a cargo of 240 tons a season?

A. Two hundred and thirty, I call it.

Q. Could you carry 230 a season?

A. Not at any time was the depression over six inches, but that occurred on the east end of the long level; that was before the construction of the reservoir; they had an abundance of water if it could be distributed, but the winds held it back so that sometimes it would be six inches below.

Q. On the Rome level, one season and another, for two or three months of the year, they don't have 6 feet?

A. I do not think it has ever been less than six and one-half; we get our full seven feet about all the time.

Q. On these disadvantages you figured the same average for the mule as steam power, didn't you?

A. I used the same condition.

Q. You did not make any allowance for this on either of them?

A. No, sir.

Q. They are all figured on the same basis?

A. Yes, sir.

Q. So that when one is susceptible of reduction the other is, also?

A. Yes, sir ; it would answer the same for both systems.

Q. So that in some instances it does trouble even the feeders on the canal ?

A. We have not been of late.

Q. In summer, when the water is low and you need all the surplus you can get at Little Falls, when the wind blows east to west, you don't get as much as when it blows from west to east—the difficulties are the same in both instances ?

A. Yes, sir.

Q. When did you have charge of the middle division ?

A. In 1859 and 1860.

By Mr. SHEARD.—Q. Have you ever had practical experience in towing by steam locomotive power ?

A. No, sir.

Q. You merely testify to-day as an amateur, not an expert ?

A. As an amateur, yes ; I have calculated, of course, the practicability of power and the method of towing, it is entirely satisfactory to me.

Q. Is your home at Albany, here ?

A. Yes, sir.

By Mr. SHEARD.—Q. Is this system of towing by locomotives in active operation anywhere that you know of ?

A. I am under the impression it is, on one of the canals of Pennsylvania to a certain extent ; I do not know which canal.

Q. You do not know, then ?

A. I do not know.

Q. Is there any in any other country you know of ?

A. I think there is a canal in France ; I cannot give any information about it.

Q. You have no practical knowledge or information as to the practicability of the affair, only what you gained from your knowledge as engineer ?

A. No, sir.

Q. That you have reduced and obtained from mathematics ?

A. Yes, sir.

By Mr. CRANE.—Q. Did you say it made a saving of two cents a bushel ?

A. Two cents on a bushel of wheat.

Q. A boat will transport, under this system two cents less on

a bushel of wheat or corn from Buffalo to New York, and make as much money as at the present system?

A. Yes, sir.

Q. That is saving somebody, either the boatman or the public, two cents a bushel?

A. Yes, sir.

Q. Have you ever seen a locomotive drawing the cars from the St. John's Park, New York, to the up-town station, in the upper end of the Island?

A. Yes, sir; often.

Q. Have you ever seen horses on the Harlem R. R. drawing from Canal street up-town?

A. Yes.

Q. How many horses does it take to draw cars loaded with ten tons?

A. Don't know; I should judge four horses are used.

Q. Four horses it takes to move and start a ten-ton car; have you seen a locomotive take twenty cars and start them?

A. Yes, sir; the power of the engine proposed for towing boats is equal to 46 horses at three miles an hour, at 160 pounds for a horse; on the average the canal engine proposed is equal to forty horses.

Q. Put eighty horses to the boat in one direction and the locomotive in the other direction, in your judgment, will the locomotive take the boat and drag it astern?

A. At forty horses the locomotive will hold them.

By Mr. CRANE.—Q. My experience is that one concentrated force will equal eighty horses, inasmuch as you cannot get the horses to act in concert?

A. That would depend upon the power of the locomotive.

By the CHAIRMAN.—Q. Would there be any question about the expediency of moving at four miles an hour in the frequent stoppages you have to make?

A. No, sir.

Q. Sailing down the canal at four miles an hour with five boats, each boat loaded with 240 tons and a lock near, can you stop conveniently as you choose?

A. Yes, no trouble about that.

Mr. CRANE.—There are many ways of doing it if desirable;

and if the locks are so near together, and we get to a gate and stop, it will regulate itself ; you can do what you desire with a locomotive.

WITNESS.—Of course the engine can be reversed rapidly.

By the CHAIRMAN.—Q. What good would that do ?

A. Check the momentum of the boat, take the line off the front, and pass it back and attach it to the centre of the train.

Mr. CRANE.—Let the line remain in the end where it is, the reversing of that engine will bring it to a dead centre, which you can't do with horses ; there is no way in the world you can handle a power you are moving as easily as by a simple contrivance in a locomotive. It would not be safe to put five boats with a stiff connection between them ; the only way is to have a flexible connection between those boats ; you can't do it any other way. It requires a good deal of skill to put these boats together, so you can couple them quick. It is very desirable to have these boats when coupled, so that it is a flexible connection, and to find out the right bend and make that connection.

By the CHAIRMAN.—Q. Do you think there would be any serious difficulty in building these tracks through cities where the buildings are close to the canal ?

A. I think in cities like Utica, Syracuse and Rochester, the berme track could be carried to the towing-path side of the canal, and the present shipping facilities saved to those cities. Or you could extend a row of pilings inside of a vertical wall without checking the water—small iron columns ; it could be done in that way.

By Mr. SHEARD.—Q. Are you an incorporator ?

A. I think I am ; I was a year ago.

Q. Are you a stockholder ?

A. I think I own a share of it.

By the CHAIRMAN.—Q. Did you subscribe for any stock ?

A. A share, I think.

Mr. CRANE.—The board has not been changed since it was created a year ago.

HENRY S. WELLS, called and testified as follows :

Q. Where do you reside ?

A. In the city of New York.

Q. What experience have you had, if any, in railroading for the last 30 years, and other public works ?

A. I have been steadily engaged since 1847 in the construction of public works, many of the important lines of the country ; the New York & Erie, the Buffalo and State Line, the Great Western of Canada, the Delaware, Lackawanna & Western, the Lackawanna & Bloomsburgh in Pennsylvania, the Warren R. R. of New Jersey, the Great Western of Canada, a portion of the direct road between Syracuse and Rochester, and a road in Georgia ; I have been engaged in the construction of canals, and am one of the parties that bought of Pennsylvania the North-Branch canal and operated that for a number of years ; but that is now turned into a railroad ; have been engaged in building the great ship canal at Lake Superior, and the entire construction of the water-works of the city of Brooklyn.

Q. The entire construction of the Brooklyn Water Works ?

A. Yes ; a contract of \$5,000,000 successfully performed, and many other works.

Q. Have you had occasion to inform yourself with regard to this system of towing boats with this locomotive power, and if so, how long since your attention was called to it, and what are the results of your examinations ?

A. About three months ago my attention was first called to it, and my opinion asked by a party in New York, who is interested in the commercial exchange ; a pamphlet was given me, and I was asked my opinion upon the feasibility of drawing boats by locomotive, and the practicability of the whole system ; I told him I would look into it and examine the pamphlet and the whole plan ; I determined that it was the project that Mr. Jarvis had laid down in his report, and was perfectly feasible and practicable, and from that time I have looked into it with great care ; I think that is the proper way to increase the capacity of the canal and make it valuable both for economy in the towing of boats, and beneficial to the boatmen and the State, and above all things, checking the great monopolies that are controlling the prices of freight both East and West. The power that is growing up and has got to its growth now, by these great corporations that have been brought into existence

by the act of the States, so concentrated that their powers are almost irresistible ; I see no other power that can check them except the power of the State of New York, through its great natural facilities. That the State of New York can do with great benefit to herself, the West, the Eastern States, and to the whole world, because you may say a great part of Europe is dependent upon us, not only for grain, but for cattle ; and the prosperity of the West is to be benefited by a cheaper method of transportation.

Q. How did this canal in Pennsylvania come to be turned into a railroad ?

A. We purchased the north branch of the Pennsylvania Canal, and the State of New York were under a contract with the State of Pennsylvania, to keep up a dam at the State Line, and connected the north branch of the Pennsylvania Canal up the Susquehanna, with the Chemung Canal at Elmira ; the State of New York refused to carry out that contract, and the consequence was, it made a break there of 17 miles that made the canal substantially useless ; and the canal was sold by consent of the State of Pennsylvania to the Lehigh Valley R. R. Co., and they availed themselves of it.

Q. Did they make provisions in the sale that they should maintain the canal ?

A. They bought the controlling interests of the stock of the canal.

Q. Was it a corporation ?

A. The State sold it to a corporation, but then gave permission to change it from a canal to a railroad.

Q. Have you had any practical experience in towing by steam power ?

A. No, sir.

Q. Never saw it done ?

A. Never saw it done.

Q. Do you know any place where it is now in actual operation ?

A. I do not.

Q. Never heard of any ?

A. No, sir.

Q. Practically you do not know anything about its results ?

A. I never saw it done ; I have no more doubt of the possibility of doing it than I have of walking to the hotel.

Q. Practically you know nothing about it ?

A. I say I have never seen it done ; but I know it can be done.

Q. You know what I mean by practical experience ?

A. I have seen cars hauled by locomotives.

Q. Have you ever seen this system tried ?

A. No, sir.

Q. You have not any practical knowledge about it ?

A. I have no practical knowledge of drawing canal boats by locomotives.

By the CHAIRMAN.—Q. You are a contractor ?

A. Yes, sir.

By Mr. CRANE.—Q. You have no question in your own mind but that a locomotive of forty-horse power, three driving-wheels, on the banks of a canal, with a tow-line, has the power of moving a train of five boats as fast as it is safe to go through that canal ?

A. I have not the slightest doubt of it.

D. E. CULVER, civil engineer, being called, testified as follows :

Examined by Mr. CRANE :

Q. Have you knowledge, if so, what, of the character of the country on the west bank of the Hudson River from Albany to New York, as regards the building of a line of railroad over that section ?

A. I'm well acquainted with that country ; I have walked over it twice.

Q. State to the committee the feasibility of that shore, with regard to the construction of a railroad from Albany to New York ?

A. I consider it very feasible.

Q. In your judgment; would \$10,000,000 build a double track railroad from Bergen Ridge to Albany ?

A. I believe it would do it ; it would cover it ; I should be willing to take the contract.

Q. Is there a population on that side of the river that would be benefited by that improvement ?

A. I consider it would be a benefit for personal convenience and the profit of trade, and by affording the facilities they do not now have to business men and residents of that section of the State of New York.

Q. Have you had occasion to come in contact upon this side with people living upon that line?

A. I think the people on the west shore are in favor of the construction of such a line, and desire it very much.

Q. You have heard the evidence?

A. Yes, sir.

Q. Have you any question but what a locomotive placed upon the banks of the canal is a practical working machine, and can be made to do what it purports to do, in drawing boats by locomotives?

A. I have no doubt of its entire feasibility, and the plan, if carried out, will prove to be successful. I have no doubt but what it will be perfectly successful. Mr. Jarvis is a perfectly safe man, and fully understands all the questions in the case. I think any man, any engineer, would say that Mr. Jarvis is a perfectly safe man to follow, one of ripe experience, and who understands all the questions that are to be taken into consideration and determined in a matter of this kind. I have seen the system of towing by locomotives on a canal tried and proved to be effective.

Q. You have?

A. Yes, sir, that is I have seen it tried in my own State, the State of New Jersey, on the Delaware and Raritan canal, between Trenton and Dean's pond, many years ago by Mr. Stevens, that is between Dean's pond station, a little below there on the Raritan canal. When the track was first laid, it was laid on the tow-path of the canal: since that time the railroad has been changed and straightened; the bank of the canal was crooked, but while that was lying there, Mr. Stevens, tried that experiment of towing barges and sailing vessels by locomotive power in fleets, somewhat as proposed here.

Q. Is there any question as to the power of the locomotive to do it?

A. None.

Q. Is the locomotive dragged into the canal because it is drawing diagonally?

A. No, sir.

Q. Then from personal knowledge and what was done there, you have no question in your own mind about this case here?

A. I have none from the natural reasoning powers that I have, even if I had not seen or known of that; I have no doubt of its feasibility.

Q. Is there an opening below Haverstraw to get down to New Jersey and Bergen Ridge?

A. Yes, sir; there is a very low valley there on Hackensack river; probably extends to within less than one-half a mile of the Hudson river.

The CHAIRMAN.—Is that still in operation there?

A. No, sir; it was a mere experiment.

Q. How long ago was it tried?

A. I think about 15 years ago.

Q. It was abandoned?

A. Yes, sir; it was merely an experiment.

Q. Then by their not continuing it, it was apparent it was not practicable?

A. No, sir; I did not take it so; the circumstances under which the experiment was made—I understood the reasons why it was not put into effect were on account of the peculiar location of that canal, the shortness of it, the expense that would be required; it was found in that case that it would require a track on each bank of the canal, and they would be compelled to put a track on the other bank of the canal, as they had a large and growing railroad business that occupied that track; instead of building another track, they cut across the country, and it made a straight line of about 20 miles in length; by leaving the canal they abandoned the project from the advantage gained to the railroad traffic; the canal company at that time was separate from the railroad company, but Mr. Stevens was a large stockholder in it; this was Edwin A. Stevens, who lived at Hoboken.

Q. It was on account of the rivalry at that time that it was not put into effect?

A. I was in the employ of Mr. Stevens at that time; I heard some talk in his house in Hoboken, and I learned from it that he had made this experiment and satisfied himself that the calculations which were made, taking into account the cost, location and the difficulties attendant upon getting a unity of in-

terest and the increased business of the railroad and the determination to straighten and change its line, prevented him from going further with it.

Q. What company was this?

A. It was the Camdem and Amboy railroad company that controlled the railroad since that time; an act which was passed in New Jersey has united the railroads.

By the CHAIRMAN.—Does the Pennsylvania Central also control the Delaware and Raritan canal?

A. It controls the united companies of which the Delaware and Raritan was one.

Q. Since the consolidation of those interests, if the experiment was practicable, why didn't they get on with it?

A. I am not able to say; I have no interest in that enterprise; my opinion is that on account of the shortness of the canal and its capacity to carry large steam tugs through it, and because they have steam towing there in that way; and it would not be of advantage to a short canal like this as it would be on a canal like the Erie.

By Mr. SHEARD.—How long was this canal?

A. I think about 40 miles.

Q. Were there many lockages?

A. Not very many; no, sir.

Q. In what capacity did you traverse the west shore of the Hudson twice afoot?

A. As owner of a part of the Jersey City and Albany railroad; I went up and down that river with a view to determine in my own mind what it would cost to complete that railroad.

Q. There has been a survey made of the west shore with the idea of building a railroad?

H. I understand so, or of some portion of it.

Q. What was the name of that company?

A. I think there was two companies besides the one I am interested in. One was the New York and Chicago and Buffalo, or some such title, and the other was the New York and Albany; I think the West Shore and Chicago is all one concern.

Q. Do you know why that was not constructed?

A. I have heard; I understood that some of the projectors of that company made a loan of five or six millions, that they got

an advance of one and a half millions and they spent that contrary to the terms of the loan, and the parties who had agreed to advance the money refused to advance any more.

Q. Have they any rights or titles on your line now ?

A. The road has been recently foreclosed.

Q. Would that interfere in any way with that proposed line line from here to New York ?

A. No, sir ; I think not.

Q. It has no connection with it, has it, that you know of ?

A. None at all ; I do not think there would be any difficulty under the railroad law of New York State to proceed to build it at once, by parties having the required capital ; I think the road is all free and open.

Q. Is this railroad company now in existence as a company—the West Shore ?

A. I think not ; it is only recently the sale has been effected ; they were obliged to go through some form of organization, and whether they have done that I do not know.

Q. They are in existence, are they not—perhaps Mr. Crane can answer ?

Mr. CRANE.—The sale has been effected, foreclosing the first mortgage, and the stockholders have no rights. They are dispossessed, and the railroad is bought in for \$35,000, under an order of the Court ; those appointed holders are mostly in Europe, and are ready to do anything they can get anything out of ; where it is now, it is entirely valueless. There are two or three corporations that may be availed of ; I can state here what arrangements have been made to perfect this line on the west shore, and I will say this : If the Legislature see fit to pass this bill, within 30 days of its passage there will be a perfect and complete organization, with adequate capital to complete a line along the Hudson river to New York.

By Mr. SHEARD.—Does this project have anything to do with the parties who have bought out the original stockholders of the Chicago and West Shore Railroad ?

***Mr. CRANE.**—Nothing whatever, direct or indirect, within my knowledge ; they are the same parties precisely who have put themselves together for the purpose of completing and perfecting a continuous line of railroad from Buffalo through to

New York, that have this in charge, and I will say here to the committee that if it was proper to give the names, some of the most eminent men of New York city, capitalists and real estate owners, men adequate to command the entire confidence of the people, are among the number; but I am not at liberty to give their names; I have simply laid this work out.

There are a body of men connected with the Produce Exchange of New York who understand this subject thoroughly. I have visited personally more than four hundred firms in the city of New York within the last twelve months, until I know their inmost surroundings, and could I give you here the history of some young men in New York, who are trying to get their living, you would see that two-thirds of that body of men were being ruined because of the system of drawbacks given to large dealers.

By the CHAIRMAN.—The committee want to get at the expediency and practicability of it.

Mr. SHEARD, to the witness.—You know personally of this towage, of the system on the canals in New Jersey.

A. I saw the boats being towed, and then I heard from the engineer of the canal and the president some details; the track was laid upon one side of the canal; on the regular side they were doing the railroad business then.

Q. It happened to lie parallel to the canal, and near enough to use the tow-line?

A. Yes, sir; the track was probably as near to the canal there, as under ordinary circumstances it would be, if there was a boat there to tow.

Q. It was not laid there for that purpose?

A. No, sir; but because of the grading of the canal; we could lay a track there and use it from Trenton to Brunswick, and so on to New York.

Q. You had no capacity in this company, so you could not say definitely whether it was a success financially or not?

A. No; I merely heard in conversation with these gentlemen and Mr. Stevens himself, that he considered it practicable; that is, that these boats could be towed by locomotives, and if the circumstances were favorable it would be a feasible thing to do.

Q. You never heard the cost?

A. No, sir; nothing farther than that.

Q. It is a fact that a great many of the railroads of New Jersey run parallel with the canal for some distance, near enough to attach a tow-line to an engine and draw a boat?

A. They did at that time; this one did.

Q. There was not any others that did?

A. Not that I know of; no, sir.

By MR. CRANE.—You spoke of the short-cut; wasn't that really the object the railroad had to keep possession of the ground for fear some one else would take it?

A. No; I should think not.

By Mr. SHEARD.—I have noticed traveling through New Jersey there were tracks, and my idea was to get the practical operation of this, whether any other railroad company had tried the system or not?

A. The Belvedere road for a short distance traverses the banks of this canal; at that time we used a part of the same line, and the cars passed over that piece of track and along the bank of the canal; one branch continued east on the New Brunswick, and the other branched off to the feeder, and so on up the Delaware river; I guess that track does now run along the bank of the canal.

Q. You know of no other place there in this or any other country where the system has been tried?

A. I have no practical information.

By MR. CRANE.—How many miles in length was this track?

A. I think it must have been probably 12 or 15 miles where it lay near the canal, and then it verged.

By THE CHAIRMAN.—You saw this experiment tried yourself?

A. I passed by and saw the locomotive actually towing the boat.

A. So you can speak of that from actual experience, that it seemed to be successful!

A. They seemed to be towing them along certainly, as fast as three or four miles an hour.

Q. This twelve miles, is it straight?

A. No, sir; a good many crooks.

Q. Did they find any difficulty in butting them against the bank?

A. No, sir ; I did not see any ; I watched them for half a mile ; I heard that the experiment, so far as the movement of the boats was concerned, was entirely successful.

Q. You think at turning points there was difficulty ?

A. I think if the boats were coupled together before the experiment was put into working, with a coupling something like that of cars only longer, with a stiff part between the part that moves there by some ball and socket joint-hinged, or something of that kind ; I don't believe there would be any difficulty whatever in steering the boats around the curves ; I think the forward and rear boats would be all that it would be necessary to steer, and that these would not steer any harder from being coupled than to go alone.

Q. Then there is no objection that you have heard of or saw in going around the bends of this canal ?

A. I never heard there was any difficulty in this experiment so far as the practical result of towing by the locomotive and running through the eanal was concerned.

By MR. CRANE.—You had that from Mr. Stevens himself ?

A. Yes, sir ; and also from the President of the canal ; I was employed as engineer by Mr. Stevens ; I should have been likely to have known if there had been a failure ; I was employed in some other work at that time ; I was in his employ, I think altogether about eight years.

Q. How long did they continue this system ?

A. It was introduced only as an experiment for several days.

Q. During that time you only saw it as you passed by ?

A. Only once, and that was about a half mile in my view.

By MR. SHEARD.—Who was president of this canal company ?

A. His name was also Stevens ; he was a relative of Edwin.

Q. Can't you give his full name ?

A. I am very defective in remembering names of people ; I guess it was John G.

Q. I suppose these tracks could be built parallel with the canal, even around the curves ?

A. There is no trouble about a three-feet gauge.

MR. CRANE.—There is not a curve in the Erie canal, to my knowledge, but what the railroad track put upon that bank will

be an easier curve than many we are passing every day of the week, and that one of the shortest curves we have in New England is on the Norwich and Worcester railroad, about 175 feet, and at that curve Mr. Laure, the chief engineer, and other engineers were called into requisition, who told the superintendent if he built that curve they could not pass it when they got it up ; one of the directors said : " I don't care what you practical engineers say, I want that curve put up just as I told you ; they put it up ; the ordinary train runs there, and has passed there and never had an accident yet ; that shows the difference between engineering on paper and one of practical results, and some of the most eminent engineers ridicule the idea of that ever being used when done, and there is not a curve on the line of your canal but what is double that radius.

MR. CRANE.—I will say that I have boatmen in New York, and I have boatmen at Buffalo, on different lines of canal, which I propose to bring here as the case proceeds, if it is called in question what this proposed plan will be for the boatmen ; if parties say boatmen are opposed to it, I wish to bring men who have been opposed to it, who are now its friends, after investigation ; until the committee is satisfied, I wish to reserve that as rebutting testimony ; if when the parties come here to oppose it, if we find it necessary, we shall bring in the rebutting testimony, and then I desire to present all the evidence, and give it to you in concise and compact form.

MR. AMES, recalled, testified :

EXAMINATION by the CHAIRMAN :

Q. You referred to the Constitution in regard to the canals of the State ; I desire to ask you whether in your opinion you think there would be anything in the passage of this bill in contravention to the spirit and letter of the Constitution ?

A. I have never considered that there was any point in the question that would interfere with the Constitution. The canal is perpetual ; " forever," is the word I think that is used. This railroad would be a part and parcel of the canal, owned by the State, improved by this improvement, and still under the same Constitution that the canal has been for the last fifty years. I would regard it as nothing more than an improve-

ment to make the canal more profitable and give greater facilities.

MR. CRANE, addressing the committee :

We owe you an apology ; I meant to have made it earlier in the case. In coming here in the middle of March, after you had been in session down to March, with a matter of so great importance, my reason was simply this : In conversation with one of the most eminent lawyers of New York, he put this question :

“ Mr. Crane, have you ever examined the Constitution of the State of New York as amended ? ” I said, “ I have an old Constitution before it was amended. ” I did not look into it. He says : “ I have looked over your bill as you have it printed in pamphlet, and I think there are some points to be questioned with regard to its constitutionality. ”

I felt that I could not ask any man to pass unconstitutional measures, but I propose to perform my duties directly under the Constitution. I said to him, “ Will you take up the question ; give it your careful consideration. ” I have been delayed upon that question more than five weeks, and when the next hearing comes on, we are going to ask the committee do this. The bill before you is still under advisement, and that bill will be amended ; and the reason why we amend it is to give you an amended bill so the committee can say : “ Gentlemen, in that bill, counsel tell us there is no infringement of the Constitution whatever. ” This party is one of the most eminent counsel in New York City. A member of Assembly said to me recently, “ Mr. Crane, waiting so long, looks as though there was a catch somewhere. ” I told him there were good and substantial reasons and we could furnish them to the committee.

THE CHAIRMAN.—The committee desire to act with candor and frankness in this matter, but this seems like an innovation.

MR. CRANE.—Yes, sir ; and I offered this apology for that reason.

MR. SHEARD.—Has there been any conclusion reached by counsel as to whether the bill is constitutional or not ?

MR. CRANE.—We will ask you to do nothing but what you can do constitutionally.

THE CHAIRMAN.—If it comes to a constitutional question we will notify you and give you another hearing. I think we have so far as we have gone, a very good knowledge of the testimony of yourself and others, as to your views of the expediency of it. If the constitutional question arises I am willing to grant a hearing on that; on the other hand if there is opposition to this bill of course gentlemen will come forth.

Mr. Ames, recalled :

By the Chairmun :

Q. Are you an incorporator?

A. Yes, sir.

Q. A subscriber in stock?

A. Yes.

MR. CRANE.—There are three incorporators at Oswego, Mr. Ames, Mr. Doolittle and Mr. Page.

MR. SHEARD —In breaking the bulk of grain this question as to the effect the Welland canal will have upon the traffic upon the Erie canal is very much dwelled upon. One of the bugbears held up is this—the grain will go from the West, East to Liverpool without breaking bulk—do you believe that to be probable in the near future?

A. No, I do not; my reasons are that the vessels that are adapted to the lake navigation are not adapted to the ocean, and the cargoes they carry are so small as compared with ocean vessels that they are not likely to make it profitable; if they could go down the St. Lawrence they could go with barges cheaper than they could with vessels.

Q. In relation to handling the grain, which you said overcame the expenses of shipment, why would it not do so profitably to carry the grain in bulk as to occasionally break the bulk and give it air?

A. I do not know as there was any advantage beyond the fact that it merely gives it an airing; when grain lies too long in the vessel or boat, it is apt to gather moisture, heat and must; being aired by elevator, dispels whatever may be accumulated of moisture or mold, therefore it is put into another or the same vessel and handled again soon. If a vessel comes from Chicago

to Oswego we run it through an elevator and to a canal boat, and in New York it is elevated and put into a ship.

Q. You said this handling actually increased the value of the grain?

A. I did say it was an advantage, but it is not an advantage that would increase the price or its value other than to prevent damage and preserve its quality.

Q. The idea of equalling at this point is this; of course you may increase the traffic of the canal or its capacity by adding steam towage; but you do not propose to change the fact that they must break their bulk. There must be these elevator charges, etc. My idea of last night tended to show how and why the canal traffic would actually be kept up; do I understand that the actual advantage to the grain when placed in market by being elevated, will overcome these technical charges?

A. I would hardly think there would be an increased value to overcome the charge of elevating; it can be done for $\frac{1}{4}$ of a cent. In the way I meant by preventing damage of long lying, that obviates the probabilities of damage or danger.

Q. There would always be a certain amount of risk in shipping grain to the East and not breaking bulk until you get to the seaboard.

A. Yes, sir; it is accounted really as a risk, because people usually calculate to buy sound grain and to handle it in a manner that shall not accumulate damage and therefore it don't come into particular account.

Q. In case you bought so many bushels of grain in Chicago to be shipped to the seaboard and you could ship it through the Welland canal without breaking bulk or through the Buffalo, Erie and Hudson with breaking bulk, which route, naturally studying your own interests, would you choose?

A. It has got to be handled if it goes by way of Montreal, for the reason there has never been a cargo sent from the western lakes to Europe; there has been lumber, etc., but I have no knowledge of grain.

Q. Will it be when the Welland canal is open the same?

A. Yes, sir.

Q. This bugbear of being obliged to ship through without breaking bulk is in fact simply a bugbear?

A. It is.

THIRD DAY'S HEARING.

TUESDAY, *March 25, 1879.*

Mr. CRANE—I have received a letter from Mr. Darius A. Ogden, ex-Canal Commissioner, which I desire to present to the committee.

LETTER FROM DARIUS A. OGDEN.

PENN YAN, *March 20, 1879.*

Mr. CRANE :

My Dear Sir—Could I have remained in Albany I would have said to the Canal Committee, that from the partial examination I have give your system of towing boats on the canals by means of an iron track and locomotive, it was practicable, and that loaded boats by this means could be propelled at least three and a half ($3\frac{1}{2}$) miles an hour (I think with greater speed), which fact would of itself more than double the capacity of the Erie canal for transportation. That is, you could move twice as many loaded boats in any given time from Buffalo to Albany. (The speed for light or partially loaded boats from Albany to Buffalo could be increased to five miles an hour.) To begin with, then, you have more than double the capacity of your canal without expense to the State; thus it is proposed to tow the boats at less than half the expense of the present cost of towing; thus cheapening navigation, and thus inviting the increased business which the increased capacity will enable you to carry. Would not this capacity to carry with the low or cheap transportation secure to you beyond question the carrying trade for the productions of the great West, as well as those of the western part of your own State, and can you retain this with the competition of Canada's Public Works and the river St. Lawrence in any other way?

Again, the result of this system will necessarily strengthen and render more permanent the canal itself. To place an iron

railway on either side of the canal, its whole length, will give solidity to its banks, will diminish the liability to breaks and injury, will facilitate repairs in case breaks do occur, will put the entire canal under constant watch and care for its whole length ; it will be an iron-bound canal, with permanent banks, and under constant surveillance, and boatmen would feel entirely secure in navigating its waters thus hemmed in and guarded, and all this secured without cost to the State ; instead of drying up this canal, it would most certainly perpetuate it, and make it as secure a waterway and route as could be—more secure than a natural river, subject to its floods and its low water. This system, doing what it proposes, gives the great desideratum permanence to your canals, with capacity and extreme cheapness of transportation. Are there doubts as to the results, let them be solved by actual experiment, put a proviso in the bill, that the bill shall not go into effect, or work begin, until a practical test or experiment has been made under the supervision of the State Engineer or Superintendent of Public Works, and their certificate of its feasibility. This certainly would take away all obligation, and a project which promises such grand results has a right to be thus tested, the object being to secure and perfect our canal system, to put it beyond danger for the future, and to secure to the State and the people the great advantages to result therefrom. I am heartily in favor of perpetuating the canals ; we can't afford to lose them, and must not.

This railway towing tracks laid down guarding and protecting the canals, subject to the control of the State authorities, what possible objection to their carrying freight and passengers in the winter or in the summer, if done so as not to impede or endanger canal navigation, would it not result in good to the people, would it not cheapen transportation by opening fair and proper competition, would it not protect the people from the extortion of great monopolies, and would not the public good be subserved thereby ? but are questions which I do not propose to discuss. The committee, I am sure, will grasp the whole question and give it a fair and candid examination, keeping in view the perpetuation and improvement of our canals, and the best possible system for reducing the cost of transportation on them. The waterways north of us are our competitors, and

we must see to it that they do not bring us to grief by increased facilities while we remain idle.

Yours truly,

D. A. OGDEN.

Mr. CRANE for the petitioners, stated that if they could have thirty minutes, they would be able to close their case, and would agree that the opponents of the bill might close either at a public hearing or in writing, as they might agree. This was acceded to by the committee.

Opportunity was then given for any other parties present for or against the bill to speak.

Mr. J. W. CULVER, an attorney from New York city, spoke in behalf of several clients, boatmen having large boating interests upon the canals, as follows :

Mr. J. W. Culver appeared before the committee and said : Mr. Chairman, I have a number of clients who are boatmen, and a number of them have been to my office in New York within the last week, respecting this bill, and I have been requested to come here to look on and hear ; I have some clients who are important forwarders, having offices in New York and Buffalo, who own a great many boats. Now, I desire to say, that so far as my connection has developed, they are unacquainted with the feasibility of the enterprise of towing boats by steam upon rails, but they are uniformly in favor of this or any other plan that can be devised, by which they can get rid of their horse power for the propulsion of boats. They told me that it cost them from 17 to 20 cents per mile to tow their boats by animal power ; they are not in favor of a railroad unless it is a better plan, but if it is, they will be in favor of it, and hope for the passage of a bill that will relieve them in that direction. They have pretty substantially told me there was no money in boating as it has been carried on for the last few years, and that it has been in consequence of low freight, and the expense in towing their boats, wear and tear, and slow mode of transportation in competing with steam railroads. Now, I know nothing about this. I simply want to place before the committee what has been said to me by these persons, that they are in favor of any plan

that will relieve them ; but they do not know, they have not investigated, and it would, of course, require experiment or some other education to develop the scheme as being practicable.

The CHAIRMAN.—I desire to ask Mr. Culver if you represent any number of boatmen in the matter ?

Mr. CULVER.—Only, sir, in the way I have stated. They have taken an interest in this thing ; some of them are owners of boats, and some of them forwarders. I have spoken to them with reference to this boat-owners' association, and they have said there was an association of boatmen in New York. I do not think any of my people belong to it ; I do not know that they do. I inquired of some of them, and they did not belong to it.

The CHAIRMAN.—From what they told you, are you under the impression that this plan will be feasible ?

Mr. CULVER.—They were acquainted with it ; they thought if it would do the work they would like to have it.

The CHAIRMAN.—Were they willing to take the chances ?

Mr. CULVER.—They were, if experienced men would approve it as I understood it.

Mr. SHEARD.—Mr. Culver, from your intercourse with boatmen, I suppose you have heard some objection to this principle ?

Mr. CULVER.—I have not ; I have heard from some of them that they knew men who were opposed to it.

Q. So far as you are able to judge, does not the objection arise more from the fear that it may ultimately dry up the canal, than it does to the proposed system of towing which the bill provides for ?

Mr. CULVER.—I do not think I have heard that suggested. They are very jealous of the Central railroad. Some of them did not know but what it might be a war on the part of the Central railroad to get possession of the canals. I think that was about the only theory that was advanced in that direction.

Q. So far as your experience with the boatmen goes, if the

fact could be fully demonstrated and proved that it was not for the purpose of drying up the canals, and driving boatmen entirely from their occupation that they would not be so much opposed to the introduction of the system?

A. So far as my observation, experience and interchange with these men go, I think they would be in favor of it.

Q. If it were not for that fear, generally speaking?

A. I think so.

By the CHAIRMAN.—Q. Did they believe it to be practicable?

A. There are not many that I have talked with that really know much about it; they think it is a new thing, and almost everything they see now is possible, and there are so many improvements they would like to see it tried.

Q. Do you think they favor a trial of this?

A. I think they would like to see the experiment tried.

Q. How many boatmen do you represent?

A. There is one house that I represent which owns a large fleet of boats, and a number of men—I do not know how many, I think four or five—have been to my office.

By Mr. VALKENBURGH.—Q. Are these gentlemen you represent owners of boats?

A. Every one of them.

Q. Who run their own boats?

A. Yes, sir; and one firm owns a good many, probably fifty.

Mr. H. E. TREMAIN, of New York city, in behalf of the petitioners, proceeded and made the closing argument as follows:

*Closing argument by MR. HENRY EDWIN TREMAIN,
of New York.*

Gentlemen of the Committee:

This measure is neither a private nor a local one. It concerns the whole people of the State. It affects the State as a commercial, social, and therefore political power, and it affects its inhabitants in their individual interests. It touches the finances of the State, its revenues, its appropriations, and its expenditures. It touches the operations of gigantic corporations and the personal industries of various classes and localities. It

touches the public and private usefulness of our great highways; the present service and future prospects of our canals; and it pretends to accomplish their immediate and permanent improvement, without the appropriation of a dollar. Without being radical in its nature, without being one step in advance or indeed scarcely coincident with the progressive spirit of our age, no proposition has been before the Legislature for many years more directly calculated to influence the material interests of our great commonwealth.

If it be true that the measure under consideration solves the problem of cheap transportation from the lakes to the seaboard, and secures appropriate and reduced prices for through and local traffic, with fixed and uniform rates at all seasons of the year; if it be true that costly improvements may be made to the State canals without taxation; if it be true that the annual expenses of keeping the canals in repair may be diminished and their revenues increased, while, at the same time, tolls may be lowered; if it be true that canal boats may be towed by locomotive power on the Erie Canal at less rate per mile than is now charged per mile on the Hudson River; if it be true that canal boats thus towed may make eleven trips per season, while now the average does not exceed seven trips; if it be true that boat owners are now running their boats without substantial profit, while by the new system they may increase their business upwards of fifty per cent., while lessening their expenses; if it be true that the canal revenues may be increased from the subsidiary traffic inevitable upon the introduction of this system of towage by locomotives; and if it be true that all these benefits may be achieved without interfering with the existing rights of any individual or corporation, and without impairing the unrestricted and perpetual control of the canals as now vested in the State of New York; then who will undertake to give any other than an affirmative answer to the question, Shall this measure prevail?

By the proceedings before this committee you have addressed yourselves, Mr. Chairman and gentlemen, towards demonstrating these facts.

Divesting myself, as far as possible, from the natural prejudice attendant upon the professional advocate, my own conviction is clear that, upon the conceded facts available to all who examine this interesting subject, and upon the evidence adduced

during the patient and discriminating investigation conducted by this committee, there is but one conclusion upon each and all of the several inquiries I have thus contingently propounded.

Cheap transportation, gentlemen, depends in the first instance upon the capital requiring income from the traffic. As between two lines of communication, the one requiring earnings on a capital of one hundred million, and the other requiring a return upon only twenty-five million, the latter can always afford, other things being equal, to do the business the cheaper.

and That under existing combinations there is a discrimination in freights from the West against New York, and in favor of Baltimore by five cents a ton, and in favor of Philadelphia by three cents, may be partially explained from the circumstance that the Baltimore and Ohio Railroad requires to earn interest, as stated before this committee, on only about fifty million dollars between Baltimore and Chicago; while the New York Central must earn or strive to earn between Buffalo and New York a return of over seven per cent. (on the average) on one hundred and fifty-two million, and the Erie say six per cent. on one hundred and twenty million.

While New York lines were not obliged to compete with those other great artificial avenues of commerce, which are drawing through their business that naturally belongs to New York, our Erie Canal acted as a regulator; and indeed, partially, though with abated influence, performs that office still. At the close of navigation, however, freights are at the mercy of this capitalized power.

The New York roads too, with their larger capital requiring income in competing for the traffic of the great West, are largely at the mercy of the roads south of us. The capital of the Central, for instance, as between New York and Chicago, is about \$220,000,000, on which an earning must be made; as against \$86,000,000 only of the Baltimore and Ohio on \$36,000,000, of which, because it is the accumulation from surplus earnings, no interest need be earned; or as against \$180,000,000 of the Pennsylvania Central. In this condition of railroad finances, when will New York cease to be, as it is now, at the mercy of its rival lines?

If the capital on which income is to be paid is but twenty-six million, and if the outside rates are fixed by the State, as in

this bill proposed, and made capable after a few years, under the State's ownership, of being adjusted upon the basis of actual cost of transportation, then the great commercial problem of New York is solved.

Leaving out of question any possibilities concerning the execution of the project, a RAILROAD SUBSIDIARY TO THE CANAL, owned by the State, run temporarily by a company under contract with the State, to tow boats at a charge not exceeding ten cents per boat per mile, and three-quarters of a cent per ton per mile for through freight; and one and a half cents per ton per mile, with twenty cents for handling local freights, and one and a half cents per mile for passengers, ACHIEVES the moment it is put in operation all the ends sought to be attained by any scheme of CHEAP TRANSPORTATION hitherto submitted.

If with these or any cheaper rates the subsidiary railroad will pay five per cent. semi-annually on its stock, and accumulate a sinking fund in the hands of the Commissioners of the Canal Fund, that in less than ten years will absorb its capital then the canal, with its subsidiary railway owned and controlled entirely by the State, will resume its normal attitude of regulating the rates of transportation between the lakes and the sea. The commerce of the great West, which finds its natural and geographical channel through the State of New York, will then be at our command; and freight and passengers may be transferred from one point to another, within our own State, at the actual cost of transportation.

First.—You secure cheap transportation because earnings on a limited capital of twenty-six million are required.

Second.—You ensure its perpetuity because the surplus earnings on this capital will in a short time vest the entire property it represents in the State.

We challenge any test to these considerations. They solve the problem of cheap transportation, which successive legislative committees have investigated, examined and fruitlessly reported upon. With all the complaints against the existing condition of affairs, and all that has been said or written on this subject, where may the definite proposition be found on which the Legislature of New York shall act?

Capital stands ready to do for the Empire State that which unfortunately, without appropriation and consequent taxation,

she is unable to do for herself. It asks no return, but a fair interest on the investment, as in due time it may be earned, and no privileges and concessions beyond those enjoyed by all the people under its Constitution and laws.

With an honest pride in the history and progress of my native State, I press the inquiry: Is it not time to progress from serious investigation to actual experiment?

The Buffalo, Syracuse and Albany Railroad Company proposes, under the control of the proper State officers, to make all the improvements necessary for establishing towage by locomotives between the Lakes and the Hudson River; to construct all the gradings, crossings, roadways, structures, and to lay all the tracks that may be necessary for that purpose. Its projected line extends not only from Buffalo to Albany, but through to New York on the west side of the Hudson, thus securing the through line to the seaboard that is essential to success. It proposes that every stone, every tie, every rail, every fixture of any kind whatever that may be placed upon the canal banks, shall immediately become the property of the State of New York; and that every item of authority and control now vested in the State over its canals shall continue as now vested by the Constitution and laws; and that the free and unrestricted use of the canals, as now provided by law, shall not be interfered with; and that all the operations of the company shall be subject to the existing rights of the State.

What is to be built upon State property by this company, injures no one but the company in case of failure, and benefits the State in any event. All the stock and obligations of the company will be subordinate to the property rights of the State, and to the right of the Commissioners of the Canal Fund to purchase the stock and bonds at the lowest price obtainable, not exceeding one hundred and fifty dollars for one hundred dollars of stock, and one hundred and thirty dollars for one hundred dollars of bonds. An income of five per cent. semi-annually on a million dollars worth of stock at par, to be transferred to the Commissioners of the Canal Fund on making the contract, is guaranteed. The State begins with an income of one hundred thousand dollars from the gross earnings of the road, payable before its current expenses, when the work between Buffalo and Albany shall have been completed. This must be within three

years. Arrangements have already been made for the completion of a road from Albany to Bergen Heights.

The earnings between Buffalo and New York, on any calculation that may be made, exhibit the ability for this road, at the rates named in the bill, to pay for itself out of its surplus earnings, over and above five per cent. semi-annually on its stock, in less than ten years. This needs no demonstration. Less promising railroads could be named whose surplus earnings have paid the original cost of construction in a shorter time. If the surplus earnings, after paying all dividends, equalled one and a half million a year, it is a simple question in arithmetic how soon this sum, in the hands of the Commissioners of the Canal Fund, compounded, in addition to the one million dollars of stock and dividends thereon, would equal twenty-five million. The large amount (namely, \$90,000,000 of stock, and \$22,000,-000 guaranteed to the Harlem) \$112,000,000, upon which the N. Y. Central pays presumably from its earnings eight per cent. per annum, in addition to paying six per cent. upon bonds of \$40,000,000, is an illustration of the possibilities on a capital of \$26,000,000.

That such surplus earnings would not be less than \$1,500,000 per annum, but probably more, is the estimate made by every expert who has examined the subject. Upon the basis of the boats moved last year, as shown by the canal reports, and that the new road will secure one-quarter of the traffic east of Buffalo and Oswego, it has been estimated that the gross earnings from Buffalo, Oswego, and intermediate points to New York, will not be less than \$7,000,000 per annum. In addition to this, of course its full share of freights from points west of Buffalo will be received the first year, which will largely increase these receipts. From \$7,000,000 deduct the estimated expenses of \$3,000,000, and (six per cent. on \$11,000,000 of bonds, and ten per cent. on \$15,000,000 of stock as contemplated) say \$2,200,000, for dividends and interest, and we have \$1,800,-000, as the lowest estimate attained for the annual benefit of the sinking fund to be created under this bill.

Giving this line the natural growth of business it will surely receive, without drawing for it upon existing lines, its friends claim that during the next ten years the annual surplus of earnings available for this sinking fund will equal three million per annum.

Accumulating thus rapidly, the State might wisely prefer not to absorb all this capital immediately. Discretion is therefore given in the bill to the Commissioners of the Canal Fund to use some part of this surplus towards paying the canal debt of the State, or towards reducing the tolls on the canals. If by such reductions the canals shall ultimately become free, it will be much more satisfactory to the people of this State than to accomplish the same purpose by constitutional amendment. It may well be doubted whether, in the present condition of affairs, or under such circumstances as are likely to exist for years to come, the people of this State will consent to be taxed for the free support of the canals.

Unless there is some grave error in these considerations, the legislation now urged points to **free canals**. If it would not ultimately make the canals a free highway, it certainly tends to render them self-sustaining. True statesmanship should be practical; and practical statesmanship demands an effort to render not only the canals, but a great thoroughfare to be constructed along their banks, free public highways, from the lakes to the sea. If you may construct one for nothing, see that the opportunity be not rejected. When the construction is in good faith proposed, give it all the sanction within your legislative authority. Instruct your respective State officers to extend all the aid within their respective spheres, and so plan your work that it shall neither burden nor annoy the people, and that it shall maintain itself, and promise it may be an ultimate revenue.

The best guarantee not only of the feasibility, but of the final success, as well as good faith and ultimate benefits of this measure, is the circumstance that the capital, not the State, incurs the risk. And "what is the motive?" asked one of the committee the other day. What is the pecuniary interest to be favored by this measure, out of which, of course, money must be made, or money would not be furnished to undertake it? The answer is: Five per cent. semi-annually on the stock, with a sinking fund certain to redeem every bond and every share of stock, at a profit, if insisted upon, of fifty per cent. on the stock, and thirty per cent. on the bonds. The sinking fund, so useful to the State, is of reciprocal advantage to the company. The proposition, of course, involves mutual benefits. Are not the benefits to the State more than adequate to the

slender service required from it in the passage of this bill, in the making of the contract called for by it, and in the supervision by the constitutional authority of the work contemplated on the public domain?

Having in view the purpose of accomplishing transportation through our State, by land or by water, through and local, at as near its actual cost as possible, the committee have wisely devoted such time as has been necessary towards establishing the facts in this respect. It may well be said, however, on the part of the State, that this is a matter of secondary importance. There will be no dispute that the establishment of a new highway, or the improvement of the canal banks, would furnish adequate motive to permit any capital standing ready to experiment for the benefit of the State.

Apart from such considerations, however, the evidence before your committee has demonstrated that canal freights on boats towed by animal power, as approvingly cited by Mr. John B. Jervis, from the report of the State Engineer (1877), John D. Van Buren, cost per ton per mile, from Buffalo to New York, 3.83 mills, and, on a similar basis, allowing, instead of seven trips to a boat a season, eleven and three-quarter trips, and towage at the rates mentioned in this bill, the actual cost per ton per mile between Buffalo and New York by the system proposed to be introduced is $2\frac{1}{2}$ mills. No item of the calculations of the scientific gentlemen making these estimates has been impugned, notwithstanding the careful cross-examinations to which they were subjected by the committee. There was some discussion concerning the length of time occupied or necessary to be consumed in lockage, as affecting the number of trips during a season. In some places five minutes are occupied in locking, and in others, where the good old ways of past generations prevail, fifteen or more minutes are occupied. As a matter of experience, under the present system, boatmen differ. As a matter of possibility, with an interested party speeding each boat in and out, with locks in fair and proper order and properly worked, all the engineers agree that five to six minutes is amply adequate. It is so reported, as the result of several timings during experiments made with steam on the canals, in the report of Mr. D. M. Greene, engineer to the commission appointed to investigate the application of steam on canal boats.

Taking the lockage at five minutes, and the average speed of a boat while in the canal at three and three-quarter miles per hour, the estimates clearly show that the boat may make over eleven trips per season, as against the seven trips a season now made. The present cost of six cents a bushel from Buffalo to New York, it is shown, may be reduced to four cents.

The grand result is obvious, that upon any calculation made the saving in actual cost of freight exceeds *thirty* per cent.

There has been some difference in opinion as to the actual cost of towage per boat per mile. The safest figures deducible from the official estimates, and from the evidence before the committee, is, that towage by animal power, as at present, costs from seventeen to twenty-three cents per boat per mile. One man, who worked his own boat, and estimated other things, thought he did it, one recent season, for thirteen cents. Some had paid as high as forty-five cents. The fair cost is not less than eighteen. This bill compels the company to contract to tow every boat at *ten* cents per boat per mile, taking it whenever ready and wherever situated.

Mr. Jervis, than whom no higher authority can be quoted on this subject, has shown, by a paper published in May, 1878, in the International Review, that in the use of steam by locomotive engines in towing canal boats, the cost of a round trip between Buffalo and Troy is reduced from the present \$423 $\frac{2}{9}$ to \$283 $\frac{7}{8}$, or a reduction of *thirty-four* per cent., or one-third of the cost by horses. These, he says, are fair and low estimates. The saving is one-third of the cost by steam. There is no speculation in this; but it is "all based on well-known principles, and may be carried into operation, as the well-established practice of engineering."

No experiments are required to demonstrate what will be the actual cost. The bill fixes that. In fact, it will be, of course, less than the rates fixed by the bill, otherwise there would be no profit, no sinking fund, no locomotive towing, no bill. But the rates named are far below the existing rates. Nor are experiments required to determine whether the scheme of this company is or is not practicable, so far as the passage of this bill is concerned. If it be not practicable, money will not be spent by capitalists in a fruitless effort. If boats cannot profitably be towed by locomotives, as all engineers agree they may be, nobody will be injured by the experiment. If the con-

trary be true, the disappearance of the mule from the tow-path, because too expensive, will only be a question of time. Steam is perfectly adapted to the canals, and the canals are adapted to steam in some form. It does not comport with the average intelligence of the age to load a boat by steam power at Buffalo, and then tow it 350 miles by horse power.

Every boatman admits one boat may be towed by locomotive; some say two or three boats may be thus towed at some rate of speed; some say five boats they think cannot be towed at a reasonable rate of speed. The testimony of engineers, however, is uniform. Five boats may be towed in a train, and at a rate from three to five miles per hour in the canal as it at present exists; that is, with boats of 240 tons and an average depth of seven feet of water.

In all these serious matters of fact there is substantial concord between the experts who have testified before you, and in published writings on the subject. I refer to the evidence of Mr. Alexander Barclay, Mr. Sylvanus H. Sweet, Mr. D. E. Culver, Mr. H. S. Welles, Mr. John B. Jervis, and to the extracts read from public documents. The recommendation of the present State Engineer to give one foot additional draft to the canals will, if adopted, permit additional speed, and encourage the towing of boats in trains; while the measures contemplated in improving the operations of locks will add to the economy of locomotive towage.

It need scarcely be added that the constant watching and work upon the tracks by a company interested in keeping the canal banks in sound condition will materially lessen the expenses for ordinary repairs of the canals.

As far as the canals are concerned, there is no question that the proposed system of towage will tend towards their immediate and ultimate benefit. But there is no fund to enable the proper officers to introduce it. There is no appropriation, nor can one be passed.

There is not any doubt of the power of the appropriate officers of this State to try this experiment. If the proper officers charged with the management of the canals, their improvement and the regulations for their navigation, would assume the grave responsibilities of making a contract with an appropriate party for locomotive towage, reserving non-interference with the use and navigation of the canals as now established by law,

that contract might be made to-day. There is nothing to prevent it either in the Constitution or statutes of this State. But it is too grave a subject for officers to touch without the sanction of the Legislature. All that this bill does is to authorize and direct the proper officers to make a contract with the Buffalo, Syracuse and Albany Railroad Company upon the terms stated.

The State exacts from the company the obligation not only to tow all boats at the rates mentioned, but to carry over the State's property, the State's railroad tracks, on the canal banks—the State's land—at all seasons of the year, whether the canals be open or closed, freight and passengers at the lowest rates mentioned.

This is the security to the State, without which but little advance would be made towards the great object to be attained. Without the business arising from carrying out this agreement the railroad company would scarcely agree to build on the property of the State, and to permit the State to buy the whole property of the railroad from its own profits. It is this subsidiary traffic, too, at all seasons, when the State shall own the entire road, that will furnish the revenues for maintaining the canals, and for affording transportation at its actual prime cost. It is therefore an essential feature of the bill.

I ask you to examine this amended bill carefully and see if I have not fairly stated its provisions and probable operation. If there be anything unconstitutional in a measure of this character, it remains for some ingenious counsel to point it out. Neither this measure nor this bill is the growth of an hour, or a day, or a month, or a year. It is a carefully prepared and digested plan, adequate to any ordeal of logic, practical mechanics, or law, presented in good faith and urged on its public merits.

Of course you must surround legislation of this character with appropriate guards to protect the interests of the State. How will you do it? The Constitution itself has fixed these guards. Besides, this bill provides that this entire contract shall be subject to the existing reservations of the State, as expressed in the Constitution. These it is not in the power of the Legislature to infringe upon. It is within the power of the Legislature, however, to control the use, navigation and improvement of the canals by appropriate instructions to the

Superintendent of Public Works; and to dictate as well as to approve or to disapprove of the rules and regulations for the use of the canals and their banks. Whatever shallow pretext has been made respecting inadequate power in these respects, under the Constitution, is entirely removed by the amendment adopted by the people in 1876, and under which the Superintendent of Public Works exercises his office. The bill itself further provides that the new system shall not interfere with the free and unrestricted use of the canals, as now provided by law.

It has been suggested, in the course of this investigation, that towage by animal power would be impracticable after the introduction of this system. This is like the suggestion that horse vehicles could not safely traverse the streets of New York where steam elevated railroads have been introduced. The railroads were, of course, prohibited from interfering with street travel, and the imaginary problem long since solved itself. If steam locomotive towage be cheaper than towage by animal power, it will soon become its substitute. Suggestions of this nature come from the same personal and inconsiderate inspiration as the views of the boatman who told the committee that if this bill was going to pass he wanted them to give him time to sell his new spans of mules before the locomotive should depress the mule market. There never was a period in history when the mule question did not solve itself without human endeavor. So in this case. The mule will not only work out his own salvation, but bring profit to the owner, who shall be relieved from feeding him.

The idea that a large class of people who traffic with the navigators and operatives of the canal will be deprived of their business is erroneous. Even if true, would that afford any reason for withholding great public improvements? But business makes more business. The moment work begins under this bill, the canal will be alive with multiplied laborers, and with a business activity never before seen along its banks. When the work shall be finished, the farmer along the canal, who now sells his produce there for man or beast, will be able to pay freight to a distant market, and receive a larger return than he now obtains. This result will inevitably flow from the cheap transportation insured by the successful introduction of the proposed system.

Permit me to allude again to this topic of cheap freights, as bearing upon the action of your committee. The company should agree to transport freight and passengers at such reasonable rates as to command the confidence of the Legislature and the people. The only objection heard against the rates named in the bill is that they are so cheap as not to be remunerative. Has not the evidence before you demonstrated otherwise? In any event, however, this consideration is not of the slightest consequence to the State. Pass this bill, and acquire the improvements; then, if it does not pay, others, not the State, will lose their money.

We have heard it also carelessly said here that the project is impracticable, and, therefore, should not be attempted. Is that logic? The world is still, and, therefore, you shall not prove that it moves? Would it be wise for the Legislature, in respect to experiments involving our commerce, our industry, our appropriations for public works, to be guided by the opinion of a few operatives, who think a scheme impracticable which they have never seen tried, and on such testimony conclude against any experiment? This spirit never would have started the telegraph between Baltimore and Washington, or built the Croton Aqueduct, the Niagara, Albany or East River bridges, or the Pacific Railroad.

Great public enterprises are entitled, if not to legislative aid, certainly to legislative sanction. The genius of our institutions is such that, without such endorsement, the public confidence essential to success is not secured.

It was useless to accumulate evidence respecting the practicability of this project. The money never could be raised to carry out this bill if its plans were not practical. If the money were raised, the scheme would never be completed if it were not practicable; and, whether practicable or impracticable, is of slight concern as affecting the merits of the measure which this committee are to report upon.

Are we right in these considerations, gentlemen? If we are, you must seek some other reason than any suggested before the committee why this bill should not become a law; and the great problem of cheap transportation solved, and an automatic regulator established by the Empire State over those ramified combinations of corporate power which have grasped the public throat as well as the public pocket, and laid a heavy hand upon

republican institutions. Your constituencies may justly demand that a measure which promises such important public achievements shall be favorably received by the Legislature.

The increased business that will be secured from the great West will not only aid the canals and their subsidiary railway, but benefit all the railroads in the State. Our three great lines will continue to be rivals; and yet the business of each, of necessity, will help the other. But they will be unable to combine.

When this new line shall get fairly in operation, the State will find itself in possession of a line of canal and railroad, earning, in a short time, a net income for the benefit of the State, estimated at five millions of dollars, which may be devoted not only to the maintenance of the canals and their improvement, but towards the expenses of the State government. New York would then own a self-sustaining highway, by land and by water. As was aptly said by Mr. Edward Crane before this committee: "Railways are nothing but improved highways; they are public ways, not private ways; and, like all public ways, should become free ways."

It may not be a sagacious policy for the State to tax its people at present for new railroad enterprises on its own account; but the wisdom of accepting a railroad to be built on its own lands in aid of its canals, without a dollar's tax or a dollar's expenditure of public funds, is too clear to admit of question.

The effect of this work would be to inspire confidence in the supremacy of our commercial metropolis, and this without large municipal subscriptions to the capital stock of tributary railroads, such as those made by Philadelphia and Baltimore to the great lines which now favor those cities as against New York city. This measure accomplished, New York city must stand in a position where in competition with those cities she would herself dictate instead of being dictated to respecting domestic and foreign shipments. It was said in the testimony here that cities compete and railroads combine. How better may New York city compete with these seaports to the south of us for our fair share of the commerce of the country?

It is idle to speculate upon the possible benefits accruing from such partial and temporary contrivances as the towing of canal boats by a tug, or their propulsion by a steam engine on

each boat, or the deepening of the canal in aid of such a system. Any such application of power carries with it a loss of twenty per cent. tonnage, and extra lockage for tugs.

Propositions of this character do not meet the issue, even if they were capable of affording temporary relief. So also do all other schemes for towage by cable or otherwise fall short of the necessities of the occasion.

- When this great work, as laid out in this bill, shall have been completed, and transportation by land and water guaranteed at or below the rates named, it will be unnecessary to speculate what commerce will come to or through New York. It will be unnecessary to inquire whether the enlargement of the Welland canal, as now contemplated, will divert commerce from New York, or from its Lake ports.

Commerce will go where its interest leads it, and if grain can be transported more cheaply from the lakes to Albany than to Montreal, or to Philadelphia, or to Baltimore, New York will do the business. The logic is irresistible.

Now, gentlemen, if the bill before you affords reasonable hope that the great purposes I have alluded to may be accomplished—and all those who have given the subject any careful consideration unite in the opinion that no measure has ever yet been devised better calculated to achieve them—can you suggest any fair grounds why this bill should not become a law, and this great experiment made, or the result attained?

In a financial, mechanical, scientific, or legal point of view, the measure is unassailable. It addresses itself to the political economist, to the scientific engineer, to the practical operative, to the lawyer, and to the home interests of a large part of our population. It addresses itself to the statesmen and politicians of our State. It addresses itself particularly to the interests of New York city, as well as to the interests of Buffalo and Oswego.

There is no view in which the measure now before the committee can be candidly examined, and its merits or its alleged disadvantages weighed, that will not, I believe, result in a favorable conclusion. If imperfect in any details, we stand ready to aid you in perfecting them. But its grand purposes are solemnly confided to your legislative judgment; to that free, frank, unfettered judgment which is the pride of the American Representative, whom power is impotent to threaten or to

cajole, and to whom the humblest citizen may trustfully appeal.

I thank the committee for the kind attention accorded me, and in the name of the Buffalo, Syracuse & Albany Railroad for the painstaking investigation you have conducted.

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